

*The Honors Program's
Center for Undergraduate Research Opportunities*



CURO

Center for Undergraduate Research Opportunities

2009 Symposium
Program and Abstracts

CURO Office
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Athens, GA 30602
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CURO 2010 Symposium Call for Abstracts



Symposium 2010

Classic Center
Athens, Georgia
Monday, March 29, 2010

CALL FOR ABSTRACTS

The Center for Undergraduate Research Opportunities at the University of Georgia provides a forum for undergraduates with a 3.4 GPA or who participate in a university-wide research program to present original research and creative works sponsored by faculty members. Undergraduate students from all disciplines are encouraged to participate. Representatives of public and private higher education institutions in Georgia are encouraged to apply.

Scholarly presentations may be in the form of an oral presentation, poster session, exhibition, performance, or work of art. Students can also present a tutorial about a research methodology or new technology. Undergraduate researchers who are at various stages of the research process are encouraged to submit abstracts describing where they are in the research process and the issues they face. Honors thesis students can also present in a Roundtable Forum. The Roundtables offer undergraduates pursuing an Honors thesis the opportunity to present their research to other thesis students working in the same discipline. Those who wish to present their work should submit an application and an abstract of a maximum of 250 words no later than **January 15, 2010** and a brief supporting letter from the sponsoring faculty member via the CURO web site no later than **January 25, 2010**. Group research projects should be submitted with one application and one letter of faculty support. All abstracts will receive graduate student peer review and feedback. All participants accepted into the Symposium will be notified by February 8, 2010, and their abstracts will be published in a book of abstracts. Sponsoring faculty are invited to preside at their students' sessions.

Best Paper Awards

Papers on work being presented at the CURO Symposium submitted by February 26, 2010 will be considered for Best Paper awards in the categories of humanities, social sciences, civic responsibility focus, international focus, and sciences. Papers must be submitted electronically to curo@uga.edu. Maximum length is 12 pages, double spaced, excluding references and appendices.

Purposes of the Symposium:

- To highlight excellence in research by undergraduate students
- To enrich the undergraduate experience by promoting communication and cooperation between faculty and students
- To provide a forum for undergraduates to communicate and disseminate their research findings and creative works
- To provide an opportunity for undergraduate researchers in the state of Georgia to engage with their peer researchers

Criteria for Selection:

- Originality and quality of research
- Quality of written abstract
- Ethical and responsible research
- Extent of the undergraduate student's involvement in development of the research design and execution of the project. Research presented at the Symposium should go beyond work completed for a class paper or project.
- Letter of support from supervising faculty

This event will be free and open to the public. All interested faculty and students are encouraged to attend the CURO 2010 Symposium. Free parking will be available at the Classic Center. Free UGA bus transportation will be available from specified locations. For more information, contact curo@uga.edu, (706) 542-5871.



CALL FOR SUBMISSIONS

The Journal for Undergraduate Research publishes original research papers in the areas of humanities, social sciences, and policy as well as art-related content. You **must present at the annual CURO Symposium in order to be eligible for publication**. Submissions are accepted throughout Spring semester at <http://www.uga.edu/juro/>.

The following general format should be adhered to as closely as possible. The cover page should include the researcher's name, the faculty advisor's name, the institution attended, the researcher's major, and the year of anticipated graduation. This information should be followed immediately by the abstract. The research article itself may be organized into the following sections: introduction, methods, findings, conclusion, and references.

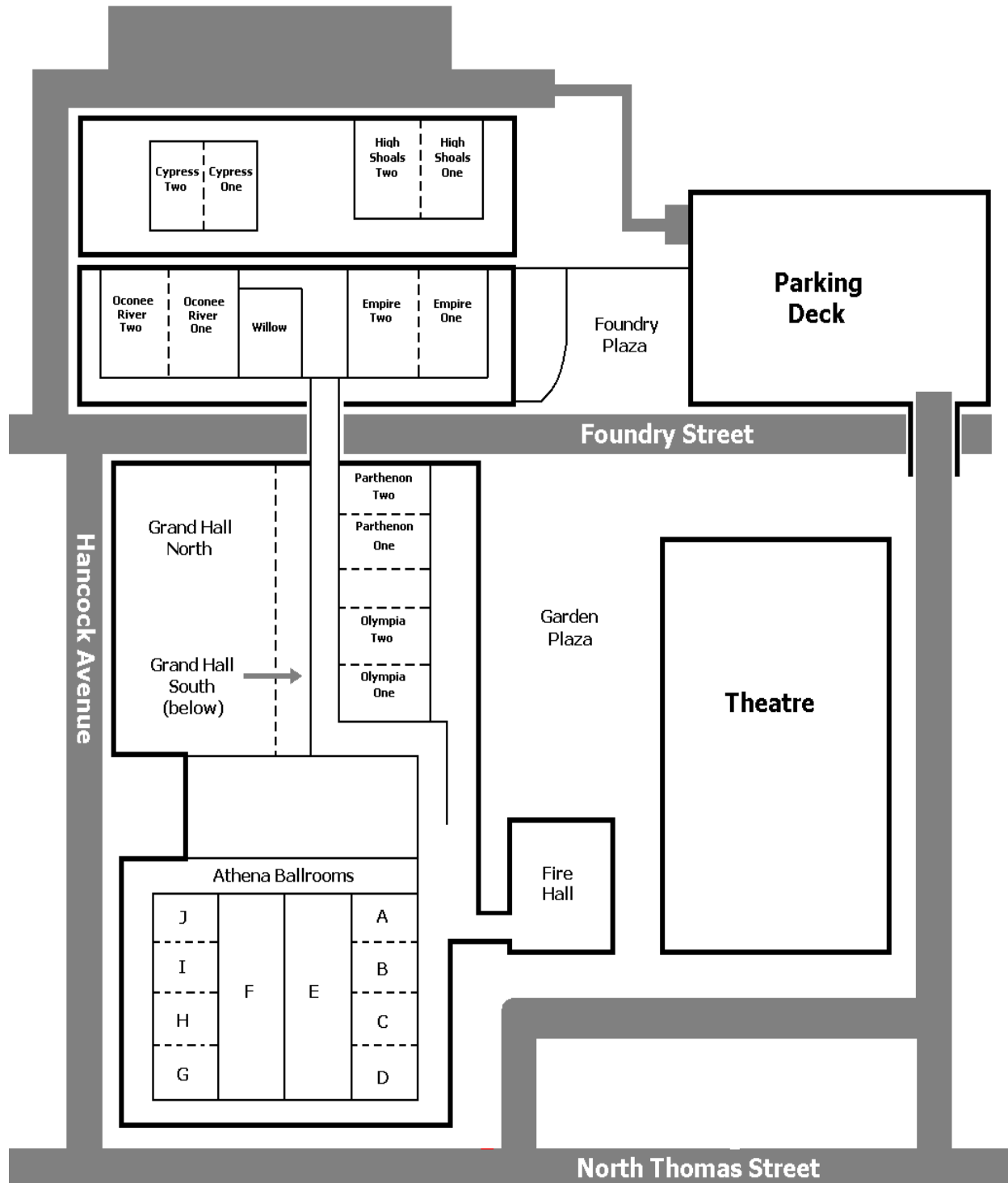
Additionally, work submitted to JURO@GA must adhere to the following guidelines:

1. Maximum length is thirty pages, double-spaced. Theses can be shortened to comprise the central idea of the research in order to be eligible for publication in the journal.
2. All submissions are submitted in English unless other arrangements are made.
3. All work must be submitted with an abstract no longer than 250 words. The abstract should provide a background sufficient to establish a context for understanding the research, summarize the research article itself, and highlight the major results.
4. References should be organized according to the standard format for the individual discipline the research topic falls under, e.g. Modern Language Association, Council of Biology Editors, American Psychological Association, or Chicago style format.
5. Work must be fully represented in digital form (preferably a Microsoft Word document for papers) and emailed to juro@uga.edu.
6. All submissions must be accompanied by a completed Submission and Faculty Advisor Approval Form found on the website at <http://www.uga.edu/juro/>.

All submissions will be evaluated according to criteria established by the editorial staff of the journal. All incoming research will be reviewed first by JURO@GA's content editors and other staff members. All prospective publications are subject to the approval of the journal's Editor-in-Chief. Upon completion of the review, the author may expect to receive either a notification of acceptance, acceptance with revisions, or a rejection of submission. Any questions about the submission process or the journal itself should be directed to juro@uga.edu. JURO@GA wishes you the best of luck with your submission and looks forward to reviewing the finished product of your hard work.

Contact JURO @ [JURO@uga.edu](mailto:juro@uga.edu) or visit our website at <http://www.uga.edu/juro/>

Classic Center Facility Layout



∞ Symposium At-A-Glance ∞

Monday, April 6, 2009

**Begin registration of oral and poster presenters;
Students hang up posters** **8:30 a.m.**
Classic Center, Lobby

Concurrent Oral Sessions **10:10 a.m.**
Classic Center, Athena Breakout Rooms A, B, C, D, G, H, I, J

Thesis Roundtable Session **10:10 a.m.**
Classic Center, Parthenon Room

Concurrent Oral Sessions **11:15 a.m.**
Classic Center, Athena Breakout Rooms A, B, C, D, G, H, I, J

Thesis Roundtable Session **11:15 a.m.**
Classic Center, Parthenon Room

Concurrent Oral Sessions **12:20 p.m.**
Classic Center, Athena Breakout Rooms A, B, C, D, G, H, I, J

Concurrent Oral Sessions **1:25 p.m.**
Classic Center, Athena Breakout Rooms A, B, C, D, I, J

Concurrent Oral Sessions **2:30 p.m.**
Classic Center, Athena Breakout Rooms A, B, C, D, J

Welcome and Opening Session **4:00 p.m.**
Classic Center, Athena Ballroom E
Dr. David S. Williams
Director, Honors Program
Dr. Arnett C. Mace, Jr.
Senior Vice President for Academic Affairs and Provost

Recognition of CURO Promising Scholars **Dr. Pamela B. Kleiber**
Associate Director, Honors Program

Introduction of Keynote Speaker **Bryan Davis**
Former CURO Apprentice
BBA/MA Accounting Candidate

**Keynote Address: “Where the Boys Aren’t”:
Sex-Ratio Imbalances and Risky Sexual Behavior** **Professor Chris Cornwell**
Head and Professor, Department of Economics

**Announcement of Excellence in Undergraduate
Research Mentoring Award** **Professor Jere Morehead**
Vice President for Instruction

∞ Symposium At-A-Glance ∞

Poster Session **5:00 p.m.**
Classic Center, Grand Hall (downstairs)

CURO Apprentice & Promising Scholars Dinner **6:15 p.m.**
Classic Center, Olympia Room

Art Gallery Talks **6:15 p.m.**
Classic Center, Fire Hall

Dr. Pamela B. Kleiber
Associate Director, Honors Program
Professor Georgia Strange
Director, Lamar Dodd School of Art
Mr. Mark Callahan
Artistic Director, Ideas for Creative Exploration

**Announcement of CURO Summer Research
Fellows, CURO Scholars, UGA Libraries
Undergraduate Research Awards, and
Best Paper Awards** **8:00 p.m.**
Classic Center, Fire Hall

Dr. David S. Williams
Director, Honors Program
Ms. Florence E. King
Assistant University Librarian for Human Resources,
Director, Miller Learning Center Electronic Library
Ms. Deborah Dietzler
Executive Director, UGA Alumni Association

Program

Monday, April 6, 2009

Concurrent Oral Sessions

Classic Center, Athena Breakout Rooms A, B, C, D, G, H, I, J

10:10 – 11:00 a.m. First Concurrent Session

Room A	Maren Smith Faculty Mentor	Senescence and the Y Chromosome Dr. Kelly Dyer, Department of Genetics
	Shelina Ramnarine Faculty Mentor	Understanding the Cell Cycle: Cyclin-Dependent Kinase Phosphorylation of Hcm1 Dr. Wyatt Anderson, Department of Genetics
	Matthew Belcher Faculty Mentor	Determinants in the Localization of Telomerase to Telomeres Dr. Michael Terns, Department of Biochemistry & Molecular Biology
Room B	Amanda Farmer Faculty Mentor	Adverse Effects After Administration of an Ionic Iodinated Contrast Media in Dogs Dr. Erik Hofmeister, Department of Small Animal Medicine
	Laura Harrison Faculty Mentor	Presence of Apoptosis, as Determined by Immunohistochemistry, in Lymphoid Tissues of Chickens Infected with Strains of Newcastle Disease Virus of Varying Virulence Dr. Corrie Brown, Department of Veterinary Pathology
	Sean O'Rourke Faculty Mentor	Neuromuscular Activation and Movement Kinematics Exhibited During Sit-to-Stand by Multiple Sclerosis Individuals Dr. Kathy Simpson, Department of Kinesiology
Room C	Talia Bromstad Faculty Mentor	In The Field: Understanding Science Through the Book Arts Prof. Amanda Burk, Department of Printmaking
	Caitlin Christopher Faculty Mentor	<i>Intoxicating Misery</i> Prof. Bala Sarasvati, Department of Dance
	Katelyn Foley Faculty Mentor	Catching the Zanies: Italian Acting and English Drama Dr. Erin Kelly, Department of English
Room D	Stefann Plishka Faculty Mentor	Imagining Constantinople: Imperial Houses of Worship as Symbols of State Ideology Dr. Asen Kirin, Department of Art History
	Michael Slade Faculty Mentor	The Chariot Above the Heavens and the Ladder Upon the Earth: An Exploration of Love in the Writings of Plato Dr. Frank Harrison, Department of Philosophy

Program

	Elizabeth Katz Faculty Mentor	How Has the Gospel of John Been Used to Denigrate the Jews? Dr. Wayne Coppins, Department of Religion
Room G	Lauren Coleman Faculty Mentor	Child Care Foundations: A Model for Employer-Based Child Care Subsidies in Athens-Clarke County, Georgia Dr. Amy Kay, Department of Child & Family Development
	Catherine Mencher Faculty Mentor	Food for Thought: A Comprehensive Overhaul of American Food Aid Policy Dr. Stacey Mitchell, Department of International Affairs
	Carolyn Crist Faculty Mentor	News in the Black Belt: Teaching Journalists How to Cover Poverty in Persistently Poor Counties Prof. John Greenman, Department of Journalism
Room H	Corbin Busby, Shelby Jones Faculty Mentor	Validity of English Dr. Sujata Iyengar, Department of English
	Laura Leidner Faculty Mentor	Poetic Pedagogy: Teaching Creative Writing at Coile Middle School Dr. Melisa Cahnmann-Taylor, Department of Language & Literacy Education
	Jeremy Akin Faculty Mentor	Answering the Call for Equity, Relevance, and Inclusion: Rethinking the Role of the Disciplinary Alternative Education in the Savannah-Chatham County Public School System Dr. Larry Nackerud, School of Social Work
Room I	Robert Jacques Faculty Mentor	Drugs and Deterrence Dr. Mark Cooney, Department of Sociology
	Katherine Cherry Faculty Mentor	Zero-Tolerance Illicit Drug Dependence Policy in the United States Military: A Need for Revision Dr. Paul Roman, Department of Sociology
	Milner Owens Faculty Mentor	The Empowerment of Character Expression Through the Use of Popular Culture in the Novels of Manuel Puig Dr. Ángel Nicolás Lucero, Department of Romance Languages
Room J	Alice Meagher Faculty Mentor	Improving the Activity of the Heterologously Expressed Soluble Hydrogenase I from <i>Pyrococcus furiosus</i> Through the Modification of the BW25113 (<i>E. coli</i> K12) Genome Dr. Michael Adams, Department of Biochemistry & Molecular Biology
	Muktha Natrajan Faculty Mentor	The Role of Integrin Activation in Increased Gliogenesis of Human Neural Stem Cell Cultures Dr. Steven Stice, Department of Animal & Dairy Science

Program

Vandana Murty Development of Alternate Sources of Macronutrients for a Sustainable Algal Biofuel System
Faculty Mentor Dr. Keshav Das, Department of Biological & Agricultural Engineering

10:10 – 11:00 a.m. First Thesis Roundtable Session

Classic Center, Parthenon Room

Table 1	Brian Gardner	Analysis of Pectate Lyase Activity in Pectin-Rich Lignocellulosic Biomass Fermentations
	Faculty Mentor	Dr. Joy Doran-Peterson, Department of Microbiology
	Jean Chi	Wing Morphology, Flight Ability and Immune Measures in Monarch Butterflies
	Faculty Mentor	Dr. Sonia Altizer, Odum School of Ecology
	Calley Mersmann	Thermal Adaptation and Substrate Limitation of Heterotrophic Soil Microorganisms
	Faculty Mentor	Dr. Mark Bradford, Odum School of Ecology
	Amanda Perofsky	Comparing Population Size Estimators for Larval Stream Plethodontids
	Faculty Mentor	Dr. John Maerz, Department of Wildlife
Table 2	Yu-Chien Cheng	Towards Generating a <i>C. elegans</i> Cell Line: Deregulating the Seam Cell Division Pattern by Inactivating Genes Involved in Cell Differentiation
	Faculty Mentor	Dr. Edward Kipreos, Department of Cellular Biology
	Wei Wang	Differential Regulation of Oxidative and Thermal Stress Tolerance Upon Changes in Levels of O-GlcNAc Modified Proteins <i>in vivo</i>
	Faculty Mentor	Dr. Lance Wells, Department of Biochemistry and Molecular Biology
	Neil Pfister	Characterizing RNA-Protein Complexes Involved in Genome Defense in Prokaryotes
	Faculty Mentors	Dr. Michael Terns and Dr. Rebecca Terns, Department of Biochemistry & Molecular Biology
Table 3	Aileen Thomas	Human Random Capacities Through Repeated Numeric Sampling
	Faculty Mentor	Dr. Nicole Lazar, Department of Statistics
	Hunter Wilson	8-Chloro-7-hydroxyquinoline and Xanthone Acetic Acid Derivatives as Photoremovable-Protecting Groups with Susceptibility to Two-Photon Excitation
	Faculty Mentor	Dr. Timothy Dore, Department of Chemistry

Program

	Tulsi Patel	Directed Differentiation of Neural Progenitor Cells into Glial Progenitor Cells
	Faculty Mentor	Dr. Steven Stice, Department of Animal & Dairy Science
	Prashant Monian	Analysis of Phospholipids in Neuronal Tissue Using Electrospray Ionization-Mass Spectrometry
	Faculty Mentor	Dr. Brian Cummings, Department of Pharmaceutical & Biomedical Sciences
Table 4	Wes Jackson	From Hills to Plains: Cormac McCarthy's Use of Terrain, Landscape, and Environment
	Faculty Mentor	Dr. Hugh Ruppensburg, Department of English
	Kelly Nielsen	Changing Places: Examining the Role of Place in Invisible Theatre Performance
	Faculty Mentor	Prof. George Contini, Department of Theatre & Film Studies
	Liana Hervas	Indigenous Peoples and Migrants: New Nationalism in Ecuador
	Faculty Mentor	Dr. Pamela Voekel, Department of History
	Rebecca Corey	<i>Lay Down Your Heart</i> , a Travel Memoir
	Faculty Mentor	Prof. Reginald McKnight, Department of English
Table 5	Madison Moore	Behavioral Changes Following Daily Practice of Saccade Tasks in Schizophrenia
	Faculty Mentor	Dr. Jennifer McDowell, Department of Psychology
	Devin Smith	Using fMRI and Neuropsychological Tests to Index Brain Function Following a History of Multiple Concussions
	Faculty Mentor	Dr. L. Stephen Miller, Department of Psychology
	Benjamin Perlow	The Ideal Religious Experience
	Faculty Mentor	Dr. Leonard Martin, Department of Psychology
	Nathan Raley	An Analysis of the Effects of Parent-Child Quality of Relationship and Parental Emotion Socialization Practices on Youth Psychosocial Functioning
	Faculty Mentor	Dr. Cynthia Suveg, Department of Psychology

11:15 – 12:05 p.m. Second Concurrent Session

Classic Center, Athena Breakout Rooms A, B, C, D, G, H, I, J

Room A	Alex Johnson	Early Voting in Georgia: A Compromise for Accessibility and Efficiency
	Faculty Mentor	Dr. Charles Bullock, Department of Political Science

Program

	Jonathan Lee	Georgia's Forest Biomass and the 2007 Energy Bill: What's Wrong and How to Fix It
	Faculty Mentor	Dr. Robert Izlar, Department of Forest Resource Management/Renewable Natural Resources Policy
	Caitlin McLaughlin	The Absence of Term Limits in the Constitution: Motivations of the Framers
	Faculty Mentor	Dr. Daniel Kapust, Department of Political Science
Room B	Caroline Colden	Vesicular Stomatitis Virus in Infected Cattle
	Faculty Mentor	Dr. Corrie Brown, Department of Veterinary Pathology
	Amanda Farmer	The Effects of Extubation with Varying Degrees of Endotracheal Tube Cuff Inflation on Endotracheal Fluid Volume in the Dog
	Faculty Mentor	Dr. Erik Hofmeister, Department of Small Animal Medicine
	Amina Farooq	Analysis of the Transcriptional Regulation of Pax6 in the Eye
	Faculty Mentor	Dr. James D. Lauderdale, Department of Cellular Biology
Room C	Kathryn Pyne	Approaches to the Refugee Humanitarian Crisis: An Examination of Refugee Trends and What Promotes Progress
	Faculty Mentor	Dr. Jerry Legge, Department of Public Administration & Policy
	Meredith Jones	Policy on the Crisis in Northern Uganda
	Faculty Mentor	Dr. Maurits van der Veen, Department of International Affairs
	Jessica Craven, Sarah Alongi	Marketing the Non-Profit Global Text Project to Universities in Developing Economies
	Faculty Mentor	Dr. Richard Watson, Department of Management Information Systems
Room D	Lindsay Jones	Characterization of an RNP Complex Involved in Invader Defense in <i>Pyrococcus furiosus</i>
	Faculty Mentors	Dr. Michael Terns and Dr. Rebecca Terns, Department of Biochemistry & Molecular Biology
	Yu-Chien Cheng	Towards Generating a <i>C. elegans</i> Cell Line: Dereulating the Seam Cell Division Pattern by Inactivating Genes Involved in Cell Differentiation
	Faculty Mentor	Dr. Edward Kipreos, Department of Cellular Biology
	Wei Wang	Differential Regulation of Oxidative and Thermal Stress Tolerance Upon Changes in Levels of O-GlcNAc Modified Proteins <i>in vivo</i>
	Faculty Mentor	Dr. Lance Wells, Department of Biochemistry & Molecular Biology

Program

Room G	Emily Yeager Faculty Mentor	Kennedy, Carter, and Obama: The Role of Faith in Three Democratic Presidential Campaigns Dr. D. Jason Berggren, Department of Political Science
	Joe Reynolds Faculty Mentor	On Faith Dr. Frank Harrison, Department of Philosophy
	Sana Hashmi Faculty Mentor	Buddha and Uncle Sam: Investigating Contemporary Buddhism in the United States and Its Evolution Dr. David S. Williams, Department of Religion
Room H	Leigh Tankersley, Robert J Gentry, Heather E Howell Faculty Mentor	How Parental Gender Beliefs Affect Children's Preference for Gender Stereotyped Toys in Low-Income Families Dr. Tsu-Ming Chiang, Department of Psychology, Georgia College & State University
	Jessica Van Parys Faculty Mentor	Analyzing the Gender Gap in Educational Achievement in Children Ages 5-12 Dr. David Mustard, Department of Economics
	Marie Clark, Alexandru Muresan Faculty Mentor	<i>Why So</i> – Exploring Non Conventional Roles of the Male and Female in Dance Partnering Prof. Bala Sarasvati, Department of Dance
Room I	Wes Jackson Faculty Mentor	From Hills to Plains: Cormac McCarthy's Use of Terrain, Landscape, and Environment Dr. Hugh Ruppensburg, Department of English
	Kelli Canterbury Faculty Mentor	Changes in Cooking and Eating Practices of Griffin, Georgia Dr. William Kretzschmar Jr., Department of English
	Yasmin Yonis Faculty Mentor	Expansion and Improvement of the Solar Cooker Project to Reduce Gender Based Violence Dr. Njeri Marekia-Cleaveland, Carl Vinson Institute of Government
Room J	Robert Bennett Faculty Mentor	Modeling HLHS: Living with Half a Heart Dr. William Kisaalita, Department of Biological & Agricultural Engineering
	Erin Kennedy Faculty Mentor	Mandatory Health Insurance: A Necessary Change Dr. Audrey Haynes, Department of Political Science
	Donald Snyder Faculty Mentor	Examining the Attitudes of Georgians Toward Universal Health Care and the Consumption Tax Dr. James Bason, Survey Research Center

Program

11:15 – 12:05 p.m. Second Thesis Roundtable Session

Classic Center, Parthenon Room

Table 1	Elizabeth Katz Faculty Mentor	A Reception History of “the Jews” in the Gospel of John Dr. Wayne Coppins, Department of Religion
	Hadas Peles Faculty Mentor	U.S. Involvement in Government Coups in Angola During the Cold War Dr. Tim Cleaveland, Department of History
	Chris Chiego Faculty Mentor	Electoral Violence in Kenya: 1997–2008 Dr. John Morrow, Department of History
Table 2	Joshua Sumislawski Faculty Mentor	The Neurotrophic Action of Botulinum Neurotoxin Dr. Julie Coffield, Department of Physiology & Pharmacology
	Diana Murro Faculty Mentor	Creation of a Transposon Mutant Library in Live Vaccine Strain <i>Francisella tularensis</i> Dr. Russell Karls, Department of Infectious Diseases
	Rachel Nix Faculty Mentor	The Effects of Fetal Genomic Expression of TNF- α RI and RII in <i>P. chabaudi chabaudi</i> Complicated Murine Pregnancy Dr. Julie Moore, Department of Infectious Diseases
	Lauren Kelly Faculty Mentor	Fibrin Deposition in the Malaria-Infected Placenta: A Disruption in the Balance Between Coagulation and Fibrinolysis Dr. Julie Moore, Department of Infectious Diseases
Table 3	Jordan Dalton Faculty Mentor	<i>Meat Out of the Eater</i> Mr. Mark Callahan, Artistic Director, Ideas for Creative Exploration
	Noah Koon Faculty Mentor	Detuning London: Street Musicians and the Noise Suppression Campaign in Victorian London Dr. Steven Soper, Department of History
	Sarah Smith Faculty Mentor	The Dehumanization of War and the Female Condition Dr. Hyangsoon Yi, Department of Comparative Literature
	Milner Owens Faculty Mentor	The Empowerment of Character Expression Through the Use of Popular Culture in the Novels of Manuel Puig Dr. Ángel Nicolás Lucero, Department of Romance Languages
Table 4	Laura Harrison Faculty Mentor	Presence of Apoptosis as Determined by Immunohistochemistry in Lymphoid Tissues of Chickens Infected with Strains of Newcastle Disease Virus of Varying Virulence Dr. Corrie Brown, Department of Veterinary Pathology

Program

Caroline Sumners	Neuropeptide Signaling in <i>Drosophila</i> : A Cell-Specific Functional Dissection of the Proprotein Processing Protease <i>Amontillado</i> (<i>amon</i>)
Faculty Mentor	Dr. Michael Bender, Department of Genetics
Lindsay Stein	Using Immunohistochemistry for the Detection of Rabies Antigen in Various Mammalian Species
Faculty Mentor	Dr. Corrie Brown, Department of Veterinary Pathology
Nithya Natrajan	Human Disease and the Kit/KitL Signaling Pathway
Faculty Mentor	Dr. Mary Bedell, Department of Genetics

12:20 – 1:10 p.m. Third Concurrent Session

Classic Center, Athena Breakout Rooms A, B, C, D, G, H, I, J

Room A	Laura Harrison	Advance Directive Reform: Reducing Medicare Spending and Increasing Respect of Patients' Rights
	Faculty Mentor	Dr. Claire Robb, Department of Epidemiology & Biostatistics
	Alexander Orellana	Berg Balance Score Correlates to Postural Stability Measures
	Faculty Mentor	Dr. Cathleen Brown, Department of Kinesiology
	Thomas Shaffer	Heart Rate Monitoring is Superior to Accelerometry as an Estimator of Human Energy Expenditure During Physical Activity
	Faculty Mentor	Dr. James Hargrove, Department of Foods & Nutrition
Room B	Jennifer Tooher, Jaharris Collier	Effects of Vertebral Fusion on Lateral Bending Spinal Motion of Women with Adolescent Idiopathic Scoliosis (AIS)
	Faculty Mentor	Dr. Kathy Simpson, Department of Kinesiology
	Jung Kim	Imaging of Seizure-Induced Ca ²⁺ Waves in Developing Zebrafish
	Faculty Mentors	Dr. Andrew T. Sornborger, Department of Mathematics and Dr. James D. Lauderdale, Department of Cellular Biology
	Christine Tarleton	The Evolution of a Scientific Community Through Social Network Analysis: The Case of Autism
	Faculty Mentor	Dr. Shane Hamilton, Department of History
Room C	Anthony Pelli	"He Can't Do This To Me!" Military Assistance, the Response of Concerned Powers, and Implications for U.S. Aid to Ukraine
	Faculty Mentor	Dr. Dmitriy Nikonov, Center for International Trade & Security

Program

	Joshua Gloster Faculty Mentor	H-1B Visa and Green Card Reform Dr. Scott Atkinson, Department of Economics
	Julie Patel Faculty Mentor	Which Factors Influence the Voting Practices of the Members of the United Kingdom Parliament on Legislation Concerning the Use of Force by the State in Military Interventions? Dr. Patricia Sullivan, Department International Affairs
Room D	Long Doan Faculty Mentor	Moods, Emotions, and Occupational Identities: A Test of Affect Control Theory Dr. Dawn Robinson, Department of Sociology
	Anna Wilson Faculty Mentor	Defining and Regaining the Human Identity: Queries of Existence in Frederick Douglass's <i>Narrative</i> Dr. Ron Miller, Department of English
	Laura Wynn Faculty Mentor	A Sense of Self: Questions of Identity in Contemporary Novels by Second-Generation Turkish-German Women Writers Dr. Martin Kagel, Department of Germanic & Slavic Languages
Room G	Marcus Hines Faculty Mentors	Analyzing the Function of O-GlcNAc in the <i>Drosophila</i> Nervous System Dr. Michael Tiemeyer and Dr. Lance Wells, Department of Biochemistry & Molecular Biology
	Neil Pfister Faculty Mentors	Characterizing RNA-Protein Complexes Involved in Genome Defense in Prokaryotes Dr. Michael Terns and Dr. Rebecca Terns, Department of Biochemistry & Molecular Biology
	Meagan Cauble Faculty Mentor	Dispersion of Carbon Nanotubes in Aqueous Solution Dr. Marcus Lay, Department of Chemistry
Room H	Daniel Cellucci Faculty Mentor	SONAR and Art: The Application of Sound to Underwater Sculpture Prof. Ralph Brown, Department of Sculpture & Studio Foundations
	Kelly Nielsen Faculty Mentor	Changing Places: Examining the Role of Place in Invisible Theater Performance Prof. George Contini, Department of Theatre & Film Studies
	Brittany Norman Faculty Mentor	Art & Engineering: A Binocular Vision Prof. Martijn van Wagtenonk, Department of Studio Foundations
Room I	Giridhar Subramanian Faculty Mentor	Power and Influence in Southeast Asia: A Study of the Methods Used by India, China, Japan, and the United States Dr. Brock Tessman, Department of International Affairs

Program

	Charles Ford Faculty Mentor	Approaching Iran: Alternative Diplomacy Dr. Sherry Lowrance, Department of International Affairs
	Liana Hervas Faculty Mentor	Indigenous Peoples and Migrants, New Nationalism in Ecuador Dr. Pamela Voekel, Department of History
Room J	Megan Matuszak, Brandi Kelley, Melissa Roth, Rachel Zudekoff Faculty Mentor	The Relationship Between Parental Disciplinary Practices and Children's Social and Emotional Competence in Low-Income Families Dr. Tsu-Ming Chiang, Department of Psychology, Georgia College & State University
	Nathan Raley Faculty Mentor	An Analysis of the Effects of Parent-Child Quality of Relationship and Parental Emotion Socialization Practices on Youth Psychosocial Functioning Dr. Cynthia Suveg, Department of Psychology
	Manouela Valtcheva Faculty Mentor	Antisaccade Performance and Deficit Characteristics in a Normal Population Dr. Jennifer McDowell, Department of Psychology

1:25 – 2:15 p.m. Fourth Concurrent Session

Classic Center, Athena Breakout Rooms A, B, C, D, I, J

Room A	Brian Watts Faculty Mentor	Thermal Adaptation of Soil Microbial Respiration in Laboratory Microcosms Dr. Mark Bradford, Odum School of Ecology
	Joseph Rimando Faculty Mentor	Evaluating the Antibody Response to Respiratory Syncytial Virus (RSV) for the Inhibition of the RSV G Protein Interaction with the CX3C Chemokine Receptor Dr. Ralph Tripp, Department of Infectious Diseases
	Agni Chandora Faculty Mentor	Use of Cholera as a Metaphor in <i>Death in Venice</i> : Health Administrational Aspects and Gustav Aschenbach's Journey Dr. Frances Teague, Department of English
Room B	Jennifer Lee Faculty Mentor	Biopsychosocial Factors and Healthcare Utilization in Children With Non-Cardiac Chest Pain Dr. Ronald Blount, Department of Psychology
	Tracy Yang Faculty Mentor	Simplification of Eligibility Requirements for PeachCare for Kids: Increasing Health Insurance Coverage for Georgia's Children Dr. Phaedra Corso, Department of Health Policy & Management

Program

	Katherine McGlamry	Glycan Interactions and the Development and Spread of Cancer Cells
	Faculty Mentor	Dr. Michael Tiemeyer, Department of Biochemistry & Molecular Biology
Room C	Madison Moore	Behavioral Changes Following Daily Practice of Saccade Tasks in Schizophrenia
	Faculty Mentor	Dr. Jennifer McDowell, Department of Psychology
	Hemali Vin	Measuring the Orderliness of Thought
	Faculty Mentor	Dr. Michael Covington, Institute for Artificial Intelligence
	Ash Sechler	<i>Borrowed Building/Search Cycle</i>
	Faculty Mentor	Mr. Mark Callahan, Artistic Director, Ideas for Creative Exploration
Room D	Tyler Kelly	String Theory and Its Mathematics
	Faculty Mentor	Dr. Elham Izadi, Departments of Mathematics
	Dillon Horne	The Development and Implications of Predictive Modes of Thought from the Renaissance to Modernity
	Faculty Mentor	Dr. Thomas Cerbu, Department of Comparative Literature
	Daisy Whelan	Weaving the Fog
	Faculty Mentor	Prof. Clay McLaurin, Department of Fabric Design
Room I	Amy Davis	Late Ming Dynasty Jingdezhen Ceramics in a Changing Economic and Cultural Context
	Faculty Mentor	Dr. Ari Levine, Department of History
	Jillian Kornau	Manicures: Not Just Paying for Pretty Nails
	Faculty Mentor	Dr. Katalin Medvedev, Department of Textiles, Merchandising, & Interiors
	Marilyn Zapf	Jewelry in the Age of Postmodernism
	Faculty Mentor	Prof. Mary Pearse, Department of Jewelry & Metalwork
Room J	Jeff Shapiro	Male Song Performance Correlates of Reproductive Success and Morphological Characters in the Dark-Eyed Junco (<i>Junco hyemalis</i>)
	Faculty Mentor	Dr. Dustin Reichard, Department of Biological Sciences
	Jean Chi	Wing Morphology, Flight Ability, and Immune Measures in Monarch Butterflies
	Faculty Mentor	Dr. Sonia Altizer, Odum School of Ecology
	Amanda Perofsky	Comparing Population Size Estimators for Stream Plethodontids
	Faculty Mentor	Dr. John Maerz, Department of Wildlife

Program

2:30 – 3:45 p.m. Fifth Concurrent Session

Classic Center, Athena Breakout Rooms A, B, C, D, J

Room A	Christine Akoh	Cloning and Expression of a <i>Burkholderia pseudomallei</i> DNA Fragment Specifying an Adherence Factor
	Faculty Mentor	Dr. Eric Lafontaine, Department of Infectious Diseases
	Diana Murro	Creation of a Transposon Mutant Library in Live Vaccine Strain <i>Francisella tularensis</i>
	Faculty Mentor	Dr. Russell Karls, Department of Infectious Diseases
	Shruti Suresh	Isolation and Identification of Novel Acidobacteria and Verrucomicrobia from Forest Soil
	Faculty Mentor	Dr. William Whitman, Department of Microbiology
Room B	Nima Patel	Georgia Senate Bills 440 and 441: The Effectiveness of the Adult Criminal System as a Deterrent to Juvenile Recidivism
	Faculty Mentor	Dr. Edwin Risler, School of Social Work
	Robert Rosenbleeth	Reducing Binge Drinking Among University of Georgia Students
	Faculty Mentor	Dr. Elaine Weeks, Department of Sociology
	Rocky Cole	Mandatory Impact Fees: A New Growth Management Strategy for Georgia
	Faculty Mentor	Dr. Andrew Carswell, Department of Housing and Consumer Economics
Room C	Jarrad Rowse	Characterizing the STE23 ORF
	Faculty Mentor	Dr. Walter Schmidt, Department of Biochemistry & Molecular Biology
	Cleveland Piggott	The Role of Microtubules in the Degradation of Hirano Bodies
	Faculty Mentors	Dr. Marcus Fechheimer and Dr. Ruth Furukawa, Department of Cellular Biology
	Neeraj Sriram	Exclusive Consumption of Sugars as a Biological Means to Convert Lignocellulosic Hydrolysates Effectively
	Faculty Mentor	Dr. Mark Eiteman, Department of Biological & Agricultural Engineering
Room D	Abby Wong	Preventative Medicine in Water Supplies: A Remodeling of Disaster Relief
	Faculty Mentor	Dr. Angela Fertig, Department of Health Policy & Management
	Reid Brown, Jessica Sterling	Watershed Land Use Effects on Carbon Processing in Streams
	Faculty Mentor	Dr. Amy Rosemond, Odum School of Ecology

Program

	Jarred Klorfein Faculty Mentor	Cap and Trade: A Comprehensive Solution to Georgia's Water Problem Dr. Todd Rasmussen, Department of Water & Soil Resources
Room J	Abigail Wilson Faculty Mentor	Bolivian Wrestlers in Skirts Dr. Katalin Medvedev, Department of Textiles, Merchandising & Interiors
	Celina Correa Faculty Mentor	Puerto Rican Feminist Thought: Boricua Dr. Doris Kadish, Department of Romance Languages
	Malorie McCloy Faculty Mentor	Altered Surfaces: Fabric Manipulation and Design Prof. Clay McLaurin, Department of Fabric Design

4:00 p.m. Welcome and Opening Session

Classic Center, Athena Ballroom E

Introductions and Welcome	Dr. David S. Williams, Director, Honors Program Dr. Arnett C. Mace, Jr., Senior Vice President for Academic Affairs and Provost
Recognition of CURO Promising Scholars	Dr. Pamela B. Kleiber, Associate Director, Honors Program
Introduction of Keynote Speaker	Bryan Davis, Former CURO Apprentice, BBA/MA Accounting Candidate
Keynote Address <i>“Where the Boys Aren’t: Sex-Ratio Imbalances and Risky Sexual Behavior”</i>	Professor Chris Cornwell, Head and Professor, Department of Economics
Excellence in Undergraduate Research Mentoring Awards	Professor Jere Morehead, Vice President for Instruction

5:00 p.m. Poster Presentations

Classic Center, Grand Hall (downstairs)

Poster #1	Erin Kennedy Faculty Mentor	Mandatory Health Insurance: A Necessary Change Dr. Audrey Haynes, Department of Political Science
Poster #2	Rocky Cole, Chris Chiego Faculty Mentor	A Season of (Info) Sharing: An Empirical Investigation of Intelligence Reform Dr. Loch Johnson, Department of International Affairs

Program

Poster #3	Al W. Ray, III Faculty Mentor	Steamed Ginger Supplementation Reduces Pain Following Eccentric Exercise-Induced Injury Dr. Patrick O'Connor, Department of Kinesiology
Poster #4	Rachel Doyle Faculty Mentor	The Effects of Corticosterone on Stress-Induced Weight Loss and Corticotrophin Releasing Factor (CRF) mRNA Expression in the Paraventricular Nucleus of the Hypothalamus (PVN) Dr. Ruth Harris, Department of Foods & Nutrition
Poster #5	Thomas Shaffer Faculty Mentor	Heart Rate Monitoring is Superior to Accelerometry as an Estimator of Human Energy Expenditure During Physical Activity Dr. James Hargrove, Department of Foods & Nutrition
Poster #6	Miriam Skiles, Lindsay Jarvis Faculty Mentor	Gender and Developmental Differences in Young Children's Autonomy Dr. Hui-Chin Hsu, Department of Child & Family Development
Poster #7	Anne Kimball Faculty Mentor	Exercise and Cognition in Overweight Children Dr. Jennifer McDowell, Department of Psychology
Poster #8	Elise Choe Faculty Mentor	Social Media Use and Belonging Dr. Megan Knowles, Department of Psychology
Poster #9	David Mitchell, Christina Smith Faculty Mentor	Ambient Gender Cue Vigilance in Choosing College Majors Dr. Victoria Plaut, Department of Psychology
Poster #10	Lenae Stansky, Krisztina Varga Faculty Mentor	The Development of Directional Understanding in Three- to Five-Year-Old Children Dr. Janet Frick, Department of Psychology
Poster #11	Carla Heyler Faculty Mentor	The Effects of Oxytocin on Food Sharing and Cooperation in the Capuchin Monkey (<i>Cebus apella</i>) Dr. Sarah Brosnan, Department of Psychology
Poster #12	Rebecca Greenberg Faculty Mentor	Decision-Making Strategies of Wild Capuchin Monkey Dr. Dorothy Fragaszy, Department of Psychology
Poster #13	Madison Moore Faculty Mentor	Behavioral Changes Following Daily Practice of Saccade Tasks in Schizophrenia Dr. Jennifer McDowell, Department of Psychology
Poster #14	Benjamin Perlow Faculty Mentor	The Ideal Religious Experience Dr. Leonard Martin, Department of Psychology

Program

Poster #15	Lauren Doyague, Elizabeth Simpson, Krisztina Varga Faculty Mentor	Facial Identity Recognition: Perceptual Narrowing From Infancy Through Adulthood Dr. Janet Frick, Department of Psychology
Poster #16	Jasmine Mathis Faculty Mentor	Perceptions About the Implementation of the Georgia Performance Standards in Mathematics Dr. Patricia Wilson, Department of Mathematics & Science Education
Poster #17	Rebecca Roulo Faculty Mentor	Natural Prevalence of <i>Phlebiopsis gigantea</i> in the Field Dr. Sarah Covert, Department of Forest Biotechnology
Poster #18	Kevin Abney Faculty Mentor	Interaction of a Putative Cell-Adhesion Protein from <i>Anophele gambiae</i> Larvae Midgut with <i>Bacillus thuringiensis</i> Cry 11Ba Endotoxins Dr. Michael Adang, Department of Entomology and Department of Biochemistry & Molecular Biology
Poster #19	Sheena Zhang Faculty Mentor	Genetic Effects of Radiation Exposure on <i>Rana terrestris</i> Populations from the Chernobyl Exclusion Zone Dr. Travis Glenn, Department of Environmental Health Science
Poster #20	Elizabeth Pollak Faculty Mentor	Age-Dependent Susceptibility to <i>Enterobacter sakazakii</i> Infection in Neonatal CD-1 Mice Dr. Mary Alice Smith, Department of Environmental Health Science
Poster #21	Akshita Khetarpal, Chris Cornelison, Mopelola Oluwadeire, Puja Bharucha, Zuhha Ashraf, Amya Lakhani, Hunter Faircloth Faculty Mentor	Chicken Pedigree Flocks are the Ultimate Source of <i>Salmonella</i> Contaminating Poultry Meat Dr. John Maurer, Department of Population Health
Poster #22	Denise Amoah, Moyo Avize, Gregory Hamilton, Ashley Cornutt, Sima Patel, Nataryana Gowda, Michelle Chua, Faculty Mentor	Vertical Transmission of <i>Salmonella</i> from Chicken Breeder Birds to Their Progeny Meat Birds Contributes to Most of the Poultry Meat Contamination Observed for <i>Salmonella</i> Dr. John Maurer, Department of Population Health

Program

Poster #23	Alexandria Byas Faculty Mentor	Determination of the Prevalence of Avian Paramyxovirus-1 in Wintering Populations of Double-Crested Cormorants Dr. Kevin Keel, Department of Population Health
Poster #24	Calley Mersmann Faculty Mentor	Thermal Adaptation and Substrate Limitation of Heterotrophic Soil Microorganisms Dr. Mark Bradford, Odum School of Ecology
Poster #25	Sarah Bowden Faculty Mentor	West Nile Virus in New York City: Using Birds as an Indicator of Spatio-Temporal Distribution Dr. John Drake, Odum School of Ecology
Poster #26	Melissa Brody Faculty Mentor	<i>Hamelia patens</i> : A Steady State Resource Dr. Ronald Carroll, Odum School of Ecology
Poster #27	Zach Anderson Faculty Mentor	Multicultural Perspectives on Landscape Change Dr. Peter Brosius, Department of Anthropology
Poster #28	Lauren Kelly Faculty Mentor	Fibrin Deposition in the Malaria-Infected Placenta: A Disruption in the Balance Between Coagulation and Fibrinolysis Dr. Julie Moore, Department of Infectious Diseases
Poster #29	Jessica Miller Faculty Mentor	Determining Genes Required for Virulence in the Opportunistic Intracellular Pathogen <i>Rhodococcus equi</i> Dr. Mary Hondalus, Department of Infectious Diseases
Poster #30	Natasha Lee Faculty Mentor	The Importance of Specific Genes Within the Cobalamin Region of Mycobacterium Tuberculosis and Their Effect on Virulence Dr. Russell Karls, Department of Infectious Diseases
Poster # 31	Joseph Rimando Faculty Mentor	Evaluating the Antibody Response to Respiratory Syncytial Virus (RSV) for the Inhibition of the RSV G Protein Interaction with the CX3C Chemokine Receptor Dr. Ralph Tripp, Department of Infectious Diseases
Poster #32	Stephanie Beavers Faculty Mentor	SCCmec-Type Classification of Methicillin-Resistant <i>Staphylococcus aureus</i> in Horses Dr. Susan Sanchez, Department of Infectious Diseases
Poster #33	Akanksha Rajeurs Faculty Mentor	Development of a System to Create Unmarked Mutations in <i>Mycobacterium tuberculosis</i> Dr. Russell Karls, Department of Infectious Diseases
Poster #34	Opeoluwa Fawole Faculty Mentor	Studying the Genetic Diversity of the var2csa Gene Dr. David Peterson, Department of Infectious Diseases

Program

Poster #35	Rachel Nix Faculty Mentor	The Effects of Fetal Genomic Expression of TNF- α RI and TNF- α RII in <i>P. chabaudi chabaudi</i> Complicated Murine Pregnancy Dr. Julie Moore, Department of Infectious Diseases
Poster #36	Lauren Byrd Faculty Mentor	Sequencing and Expression of Infectious Bronchitis Virus Nucleocapsid Protein Gene for Use in an Infectious Clone Dr. Mark Jackwood, Department of Population Health
Poster #37	Josh Sumislawski Faculty Mentor	The Neurotrophic Action of Botulinum Neurotoxin Dr. Julie Coffield, Department of Physiology & Pharmacology
Poster #38	Kathryn Turner Faculty Mentor	Inhibition of LPA Signaling Pathways by RGS Protein Overexpression in Ovarian Cancer Cells Dr. Shelley Hooks, Department of Pharmaceutical & Biomedical Sciences
Poster #39	Logan Davis Faculty Mentor	Long-Range Retrograde Neurotrophic Signaling in Mouse Sympathetic Neurons Dr. James Franklin, Department of Pharmaceutical & Biomedical Sciences
Poster #40	Brian Gardner Faculty Mentor	Analysis of Pectate Lyase Activity in Pectin-Rich Lignocellulosic Biomass Fermentation Dr. Joy Doran-Peterson, Department of Microbiology
Poster #41	Jennifer Taylor, Poonam R. Patel Faculty Mentor	Genetic Duplication and Amplification in the <i>Acinetobacter baylyi</i> ADP1 Genome Dr. Ellen Neidle, Department of Microbiology
Poster #42	Shruti Suresh Faculty Mentor	Isolation and Identification of Novel Acidobacteria and Verrucomicrobia from Forest Soil Dr. William Whitman, Department of Microbiology
Poster #43	Aalok Sanjanwala Faculty Mentor	The Physiological Effects of Hirano Bodies in Neuronal Cells Expressing Mutated Tau Dr. Marcus Fechheimer, Department of Cellular Biology and Dr. Ruth Furukawa, Department of Cellular Biology
Poster #44	Nisha Gupta Faculty Mentor	The Role of Hirano Bodies and the Amyloid Precursor Protein in Alzheimer's Disease Dr. Marcus Fechheimer, Department of Cellular Biology
Poster #45	Amina Farooq Faculty Mentor	Analysis of the Transcriptional Regulation of Pax6 in the Eye Dr. James Lauderdale, Department of Cellular Biology
Poster #46	Haylee Humes Faculty Mentor	How AICD and Fe65 Are Recruited to Hirano Bodies Dr. Marcus Fechheimer, Department of Cellular Biology

Program

Poster #47	Tulsi Patel Faculty Mentor	Directed Differentiation of Neural Progenitor Cells into Glial Progenitor Cells Dr. Steven Stice, Department of Animal & Dairy Science
Poster #48	Whitney Boland Faculty Mentor	Novel Enzyme Dr. Joy Doran-Peterson, Department of Microbiology
Poster #49	Nirzari Patel Faculty Mentor	Comparison of Gnt-V Expression in Different Human Carcinoma Cell Lines Dr. Michael Pierce, Department of Biochemistry & Molecular Biology
Poster #50	Jared McKinnon Faculty Mentor	A Physical and Enzymological Characterization of Human Neuron Specific Enolase Dr. John Brewer, Department of Biochemistry & Molecular Biology
Poster #51	Kristen Chicola Faculty Mentor	Distinct Processing Activities Are Associated with <i>Trypanosoma brucei</i> CaaX Proteases Dr. Walter Schmidt, Department of Biochemistry & Molecular Biology
Poster #52	Jackie Lastra Faculty Mentor	Transcription Regulation by the Bacteriophage T4 AsiA Protein: AsiA Interactions with the Beta Subunit of RNA Polymerase Dr. Jeffery Urbauer, Department of Chemistry
Poster #53	Steven Johnson Faculty Mentor	Use of Click Chemistry to Assess Glycoprotein Dynamics in Cultured Cells Dr. Richard Steet, Department of Biochemistry & Molecular Biology
Poster #54	Marcus Hines Faculty Mentors	Analyzing the Function of O-GlcNAc in the <i>Drosophila</i> Nervous System Dr. Michael Tiemeyer and Dr. Lance Wells, Department of Biochemistry & Molecular Biology
Poster #55	John Marshall Faculty Mentor	Investigation of the Genetic Basis of Longevity in <i>Caenorhabditis elegans</i> Using DNA Microarray Analysis Dr. Lance Wells, Department of Biochemistry & Molecular Biology
Poster #56	Marissa Ludley Faculty Mentor	Comparative Studies on IDE-Activating Compounds Dr. Walter Schmidt, Department of Biochemistry & Molecular Biology
Poster #57	Angela Zachman Faculty Mentor	Effect of Microbead Substrates on the Morphology of H945RB.3 Human Neural Progenitor Cells Dr. William Kisaalita, Department of Biological & Agricultural Engineering

Program

Poster #58	Alex Fouraker Faculty Mentor	Bipedal Stair Climbing Robots Dr. Chi Thai, Department of Biological & Agricultural Engineering
Poster #59	Neeraj Sriram Faculty Mentor	Exclusive Consumption of Sugars as a Biological Means to Convert Lignocellulosic Hydrolysates Effectively Dr. Mark Eiteman, Department of Biological & Agricultural Engineering
Poster #60	Aileen Thomas Faculty Mentor	Human Random Capacities Through Repeated Numeric Sampling Dr. Nicole Lazar, Department of Statistics
Poster #61	Whitney Ingram Faculty Mentor	The Effect of Titanium Dioxide Surface Area on Its Photocatalytic Activity Dr. Yiping Zhao, Department of Physics & Astronomy
Poster# 62	Hunter Wilson Faculty Mentor	8-Chloro-7-hydroxyquinoline and Xanthone Acetic Acid Derivatives as Photoremovable-Protecting Groups with Susceptibility to Two-Photon Excitation Dr. Timothy Dore, Department of Chemistry

6:15 – 8:00 p.m. Art Gallery Talks

Classic Center, Fire Hall

Introductions

Professor Georgia Strange, Director, Lamar Dodd School of Art
Mr. Mark Callahan, Artistic Director, Ideas for Creative Exploration

Visual Arts Presenters

Talia Bromstad
Faculty Mentor

In The Field: Understanding Science Through The Book Arts
Prof. Amanda Burk, Department of Printmaking

Jordan Dalton
Faculty Mentor

Meat Out of the Eater
Mr. Mark Callahan, Artistic Director, Ideas for Creative Exploration

Brittany Norman
Faculty Mentor

Art & Engineering: A Binocular Vision
Prof. Martijn van Wagtenonk, Department of Studio Foundations

Malorie McCloy
Faculty Mentor

Altered Surfaces: Fabric Manipulation and Design
Prof. Clay McLaurin, Department of Fabric Design

Ash Sechler
Faculty Mentor

Borrowed Building/Search Cycle
Mr. Mark Callahan, Artistic Director, Ideas for Creative Exploration

Daisy Whelan
Faculty Mentor

Weaving the Fog
Prof. Clay McLaurin, Department of Fabric Design

Program

Marilyn Zapf
Faculty Mentor

Jewelry in the Age of Postmodernism
Dr. Mary Pearse, Department of Jewelry & Metalworking

Art exhibit arranged by Mr. Jeffrey Whittle, Gallery Director, Lamar Dodd School of Art

8:00 p.m. Dessert Reception & Awards Ceremony

Classic Center, Fire Hall

**Presentation of CURO Summer
Research Fellows, CURO Scholars,
UGA Libraries Undergraduate
Research Awards, and
Best Paper Awards**

Dr. David S. Williams, Director, Honors Program
Ms. Florence E. King, Assistant University Librarian for Human
and Director, Miller Learning Center
Ms. Deborah Dietzler, Executive Director, UGA Alumni
Association

∞ Excellence in Undergraduate Research Mentoring Awards ∞

The office of the Senior Vice President for Academic Affairs and Provost and the Honors Program established the Excellence in Undergraduate Research Mentoring Award in 2001. This award recognizes faculty, departments, and programs devoted to outstanding research mentorship of undergraduate students. Awards will be presented at the CURO Symposium Awards Ceremony on Monday, April 6, 2009 at 4:00 p.m. in the Classic Center, Athena Ballroom E.

2009 Awards

Early Career Faculty Award

Dr. Brian S. Cummings, Assistant Professor of Pharmaceutical & Biomedical Sciences

Dr. Anna C. Karls, Associate Professor of Microbiology

Dr. Dawn T. Robinson, Associate Professor of Sociology

2008 Awards

Master Level Faculty Award

Dr. John J. Maurer, Professor of Population Health

Early Career Faculty Award

Dr. Walter K. Schmidt, Assistant Professor of Biochemistry & Molecular Biology

Program Award

Biomedical and Health Sciences Institute

2007 Awards

Master Level Faculty Award

Dr. Timothy Hoover, Associate Professor of Microbiology

Early Career Faculty Award

Dr. Steven Stice, Professor of Animal & Dairy Science

2006 Awards

Master Level Faculty Award

Dr. Patricia Hunt-Hurst, Associate Professor of Textiles, Merchandising & Interiors

Early Career Faculty Award

Dr. Rodney Mauricio, Professor of Genetics

Graduate Student Award

Christopher Anderson, PhD candidate in Ecology

Graduate Student Recognition

Dawn Holligan, PhD student in Plant Biology

∞ Excellence in Undergraduate Research Mentoring Awards ∞

2005 Awards

Faculty Awards

Dr. Gary Barrett, Odum Professor of Ecology
Dr. Sidney Kushner, Professor of Genetics

Department Award

Department of Cellular Biology

2004 Award

Faculty Award

Dr. William S. Kisaalita, Associate Professor of Biological & Agricultural Engineering

2003 Awards

Faculty Award

Dr. Jody Clay-Warner, Assistant Professor of Sociology

Department Award

Department of Microbiology
Dr. Duncan Krause, Department Head
Dr. Timothy Hoover, Undergraduate Coordinator

Program Award

The Pratt Laboratory of Plant Genomics and Bioinformatics
Dr. Lee H. Pratt, Professor
Dr. Marie-Michèle Cordonnier-Pratt, Senior Research Scientist

2002 Awards

Faculty Awards

Professor William D. Paul, Jr., Professor of Art
Dr. Katherine Kipp, Associate Professor of Psychology

Faculty Recognition

Dr. Susan Sanchez, Assistant Professor of Veterinary Medicine

Department Award

Department of Biochemistry & Molecular Biology
Dr. J. David Puett, Department Head

Program Award

“Physics Beyond the Boundaries”: National Science Foundation, REU Program
Dr. Loris Magnani, Principal Investigator, Professor of Physics and Astronomy
Dr. Heinz-Bernd Schuttler, Professor and Department Head of Physics and Astronomy
Dr. Jonathan Arnold, Professor of Genetics
Dr. Susmita Datta, Professor, Georgia State University
Dr. David Logan, Professor, Clark Atlanta University
Dr. William Steffans, Professor, Clark Atlanta University

∞ Excellence in Undergraduate Research Mentoring Awards ∞

2001 Awards

Faculty Award

Dr. Marcus Fechheimer, Professor of Cellular Biology

Faculty Recognition

Dr. David MacIntosh, Associate Professor of Environmental Health Sciences

Dr. Dean Rojek, Associate Professor of Sociology

Department Award

Genetics Department

Dr. John MacDonald, Department Head and Professor

Program Award

Savannah River Ecology Laboratory

Dr. Paul Bertsch, Director

❧ *Thanks and Acknowledgements* ❧

Graduate Student Reviewers for CURO 2009 Symposium

William Abney	Comparative Literature
Ashley Barr	Sociology
Rebecca Cheney	Adult Education, Gerontology
Sarah Craven	Microbiology
Patti Davis	Social Psychology
Jim Gigantino	History
Stephanie Hazel	Higher Education
Erik Jacobson	Math Education
Lisa Kanizay	Plant Biology
Tyler Kartzinel	Ecology
Anna McKee	Forestry & Natural Resources
Sharon O'Kelley	Math Education
Aaron Petrey	Biochemistry & Molecular Biology
Natalie Pope	Social Work
David Porcaro	Educational Psychology, Instructional Technology
Sarah Reiff	Cellular Biology
Katherine Robbins	Food Science
Laura Singletary	Math Education
Gaston "Chip" Small	Ecology
Shannon Whitlock	English

Faculty Reviewers for Best Paper Awards

Dr. Harry Dailey	Professor, Biochemistry & Molecular Biology, Microbiology Director, Biomedical and Health Sciences Institute
Dr. Margaret E. Holt	Professor Emerita, Adult Education
Dr. Sylvia Hutchinson	Professor Emerita, Higher Education, Reading Education and Coordinator, Emeriti Scholars
Dr. Douglas A. Kleiber	Professor, Counseling Psychology
Dr. Richard Siegesmund	Professor, Art Education
Dr. Frances Teague	Professor, English
Dr. Kalpen Trivedi	Director, UGA at Oxford Study Abroad Program

Graduate Student Reviewers for Best Paper Awards

Will Abney	Comparative Literature
Patti Davis	Social Psychology
Stephanie Hazel	Higher Education
Tyler Kartzinel	Ecology
Anna McKee	Forestry & Natural Resources
Sharon O'Kelley	Math Education
David Porcaro	Educational Psychology, Instructional Technology
Sarah Reiff	Cellular Biology
Laura Singletary	Math
Shannon Whitlock	English

❧ *Thanks and Acknowledgements* ❧

Reviewers for Excellence in Undergraduate Research Mentoring Awards

Dr. Jerry Legge	Professor and Associate Dean, School of Public & International Affairs
Dr. Timothy R. Hoover	Associate Professor and Associate Department Head, Microbiology, Franklin College of Arts & Sciences
Dr. Patricia Hunt-Hurst	Professor and Department Head, Textiles, Merchandising & Interiors, College of Family & Consumer Sciences
Dr. Sidney Kushner	Distinguished Research Professor, Genetics, Franklin College of Arts & Sciences
Dr. Susan Sanchez	Associate Professor, Infectious Diseases, College of Veterinary Medicine
Dr. Walter Schmidt	Assistant Professor, Biochemistry and Molecular Biology, Franklin College of Arts & Sciences
Dr. Steven Stice	Georgia Eminent Scholar and Professor, Animal & Dairy Science, College of Agricultural & Environmental Sciences

Reviewers for CURO Summer Research Fellowships

Dr. Wyatt Anderson	Alumni Foundation Distinguished Research Professor, Genetics
Dr. E. M. Beck	Meigs Professor, Sociology
Dr. Katarzyna Jerzak	Associate Professor, Comparative Literature
Dr. Michael Roden	Professor and Department Head, Geology
Dr. Regina Smith	Associate Vice President, Office of Vice President for Research
Dr. Frances Teague	Meigs Professor, English
Dr. Juergen Weigel	Professor, Microbiology

CURO Advisory Board

Dr. Wyatt Anderson	Alumni Foundation Distinguished Professor, Genetics
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Prof. Jere Morehead	Vice President for Instruction
Dr. David Saltz	Department Head and Associate Professor, Theatre & Film Studies
Dr. Susan Sanchez	Associate Professor, Athens Diagnostic Laboratory, College of Veterinary Medicine
Dr. Fausto Sarmiento	Assistant Professor, Geography
Dr. Steven Stice	Georgia Eminent Scholar and Professor, Animal & Dairy Science
Dr. Kecia Thomas	Professor, Psychology and Senior Advisor to the Dean of Franklin College of Arts & Sciences
Dr. Katharina Wilson	Professor, Comparative Literature
Ms. Adele Handy	Undergraduate Student
Ms. Courtney Thomas	Undergraduate Student
Ms. Tulsi Patel	Undergraduate Student

Interaction of a Putative Cell-Adhesion Protein from *Anopheles gambiae* Larvae Midgut with *Bacillus thuringiensis* Cry 11Ba Endotoxins

Kevin Abney

Dr. Mike Adang, Department of Entomology and Department of Biochemistry & Molecular Biology, University of Georgia

Mosquitoes in the genus *Anopheles* vector malaria, a devastating disease, especially in Africa. This research investigated a protein in the gut of mosquito larvae that is a key to understanding how an insecticidal protein of *Bacillus thuringiensis* (*Bt*) kills mosquito larvae. With this information we may be able to make *Bt* more effective in controlling mosquitoes. The protein I am investigating is called AgPCAP for *Anopheles gambiae* putative cell-adhesion protein. AgPCAP is a member of a protein family called cadherins. To investigate interactions between AgPCAP and *Bt* Cry 11Ba, the cDNA encoding PCAP protein was divided into parts called CR 14-MPED and TM-CYTO and these protein parts were expressed in the bacterium *Escherichia coli*. The CR 14-MPED protein was found to bind to the *B. thuringiensis* Cry 11Ba toxin with high affinity, while the PCAP TM-Cyto fragment showed no specific binding. Bioassays have also shown that CR 14-MPED inhibited Cry 11Ba toxicity against the 4th instar *A. gambiae* larvae. These results, along with ability of the CR-14 MPED fragment to bind to vesicles in the midgut (BBMV) of larval *A. gambiae*, are evidence that the CR 14-MPED region of PCAP has a strong attraction to the toxin and that the PCAP protein is probably a receptor for the *Bt* toxin in *A. gambiae* larvae. This information will be helpful in designing novel *Bt* proteins for mosquito control.

Answering the Call for Equity, Relevance, and Inclusion: Rethinking the Role of the Disciplinary Alternative Education in the Savannah-Chatham County Public School System

Jeremy Akin – Roosevelt@UGA

Dr. Larry Nackerud, School of Social Work, University of Georgia

In light of the Savannah-Chatham County Public School System's mission statement, "From school to the world: *All* students prepared for productive futures," questions as to the thoroughness and equity with which support is shown to students enrolled in its disciplinary alternative education program must be addressed. The Scott Alternative Learning Center-the system's only disciplinary alternative school-faces increasing difficulty in its ability to sustainably provide its students with a quality education and atmosphere for behavioral growth due to (and evidenced by) problems associated with dramatic system-wide increases in punitive referrals, rapid program overcrowding, high truancy rates, and top levels of juvenile prison placements. In addition, the school system's recent adoption of zero-tolerance discipline policies, which suspend or expel students for misbehavior that would have previously merited less severe repercussions, reveals further grounds for concern. From a careful review of the literature, on-site visits, and analysis of official school system records, this policy proposal details specific reforms which employ existing institutions and city partnerships for the benefit of both students at the Scott Center and the wider Savannah community. Best practices of similar disciplinary alternative schools are also considered in a Savannah-appropriate context. Such revitalized investment in the lives of students at the Scott Center will positively impact system accountability, levels of juvenile delinquency, graduation rates, and the quality of Savannah's local workforce.

Cloning and Expression of a *Burkholderia pseudomallei* DNA Fragment Specifying an Adherence Factor

Christine Akoh – CURO Apprentice

Dr. Eric Lafontaine, Department of Infectious Diseases, University of Georgia

Burkholderia pseudomallei (*Bp*) is a Gram-negative bacterium which causes the infectious disease melioidosis in humans. *Bp* is endemic to parts of Southeast Asia and Northern Australia and can be readily isolated from wet soils. Melioidosis is difficult to diagnose and *Bp* is intrinsically resistant to most antibiotics

complicating treatment considerably. The infectious dose of *Bp* is not known, but experiments with various animal models have demonstrated that the lethal dose is very low. For these reasons, the organism has been classified as a Category B Select Agent of bioterrorism, and there is an urgent need to develop a vaccine to protect against *Bp*. Previous studies by our laboratory suggest that multiple proteins of *Bp* mediate adherence to respiratory epithelial cells. Adherence is a crucial step in pathogenesis by most infectious agents because it leads to colonization. The purpose of our research is to evaluate the vaccinogenic potential of *Bp* adherence proteins. My research project focuses on one adherence factor designated BoaC. A DNA fragment specifying a large portion of BoaC was amplified from the genome of *Bp* strain 1026b. We are currently trying to clone this PCR product into the Hind III and Pac I sites of the plasmid pETcoco-1. Preliminary experiments indicated that the cloning was unsuccessful. Once we successfully clone the BoaC fragment in pETcoco-1, we will purify the recombinant protein (via a six histidine affinity tag) and test its immunogenicity in mice. This work will further our goal of developing potential vaccine candidates to protect against *Bp*.

Vertical Transmission of *Salmonella* from Chicken Breeder Birds to Their Progeny Meat Birds Contributes to Most of the Poultry Meat Contamination Observed for *Salmonella*

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Salmonella is one of the leading causes for food illnesses in the world. Poultry meat and eggs have been implicated in many foodborne outbreaks. Within poultry companies, *Salmonella* can be spread to consumable, meat birds either through horizontal, direct, or indirect contact with contaminated environment, or vertical transmission, where *Salmonella* is transmitted from the parent breeder birds to their

progeny meat birds. We believe that vertical transmission in poultry companies contributes to most of the *Salmonella* contamination of poultry meat. *Salmonella* was isolated from pullet chicken farms (reproductively, immature breeder birds), broiler-breeder chicken farms (reproductive breeder birds), and broiler chicken (meat birds) farms, which included the environment, the hens and broiler chickens themselves. We used pulsed field gel electrophoresis (PFGE) in this study to tie the *Salmonella* isolated from the chicken carcass back to the broiler, broiler-breeder farm, or pullet farms. PFGE is the standardized protocol used by the CDC to identify outbreaks by matching bacterial DNA fingerprints. Our results indicate that *Salmonella* strains from chicken carcasses matched with *Salmonella* isolated from the pullet or broiler-breeder farms. However, we also observed matches only between chicken carcasses and broiler farms. Based on the evidence presented, we observed both vertical and horizontal transmission of *Salmonella* within a poultry company. To reduce chicken carcass contamination of *Salmonella* will require some intervention strategy applied at both the broiler-breeder and broiler level.

Multicultural Perspectives on Landscape Change

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The ecological and cultural landscapes in which each of us lives shape our personal identity and sense of place. As these landscapes change over time, our sense of identity and place are also changed. This research was undertaken as a multi-sited, non-structured case study of traditional villages in Fiji and Brazil. Both study areas have seen dramatic landscape changes over recent decades. The goal of this research was to document changes in the way that residents think about themselves and their land. In addition to non-structured interviews and community interaction, I conducted a review of research in both study areas. In both areas there has been work done by community members to create community-based conservation

organizations designed to protect both the local environment and traditional culture. These groups, specifically the Waitabu Marine Park in Fiji and the Projecto Saude e Alegria in Brazil, have been relatively successful at their goals by allowing local people to seek alternative means of income while maintaining traditional ways of life and preserving landscapes; however, the impact they have had on community members' sense of place and connectedness to their landscape has differed. This study is valuable to global conservation because it explores the factors that influence people's connectedness with their landscape. In studying these factors, the goals are to understand why locally managed conservation works well in some areas but not in others and to use this knowledge to improve the design of conservation projects in the future.

SCCmec-Type Classification of Methicillin-Resistant *Staphylococcus aureus* in Horses

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Staphylococcus aureus, a ubiquitous, gram-positive bacterium, colonizes the skin of many species, generally without causing infection; methicillin-resistant *Staphylococcus aureus* (MRSA), however, can cause severe infections in both humans and animals. The *mecA* gene, located on the staphylococcal chromosomal cassette (SCCmec) of *S. aureus*, encodes for resistance to beta-lactam antibiotics and has become increasingly prevalent in *Staphylococcus* species in recent years. From 1995 to 2003, when MRSA, particularly SCCmec type IV, was emerging as a community-acquired pathogen in humans in the United States, 167 equine isolates of *S. aureus* from various infection sites were collected in Georgia and Kentucky. As horses often live in close contact with humans, the emergence of SCCmec types in equine MRSA infections may reflect similar trends as those observed in humans; thus, polymerase chain reaction (PCR) analysis was performed on these samples to investigate possible correlations between the rising numbers of equine and human MRSA infections. Seventy samples tested positive for

the *mecA* gene and were then classified by SCCmec type. The resulting data suggest that SCCmec type IVd has predominated in the equine populations of both Kentucky and Georgia for several years. As suspected, the emergence of SCCmec type IVd MRSA in the equine population between 1995 and 2003 appears to closely mirror the increasing prevalence of SCCmec type IV observed in humans. These findings hold important implications for veterinarians and may provide valuable insight for the study of zoonotic transmission of MRSA to the individuals who work and live closely with these animals.

Determinants in the Localization of Telomerase to Telomeres

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Due to the unidirectional nature of DNA polymerase, linear eukaryotic chromosomes become shorter with each round of DNA replication and cell division. This shortening is counteracted by telomerase, which when activated can confer an unlimited capacity for cell division. While telomerase is not active in most human somatic cells, it is activated in over 90% of cancers, immortalizing the cells. In cancer cells, we have found that the activity of telomerase is restricted to S phase of the cell cycle through regulated trafficking of two telomerase components, human Telomerase RNA (hTR) and human Telomerase Reverse Transcriptase (hTERT).¹ To better understand the recruitment of telomerase to telomeres, I observed the localization of the two components of telomerase in cells expressing specific mutants of the protein component hTERT. I did this by transfecting telomerase positive human cervical cancer cells with the TERT mutants along with the second telomerase component, hTR. We then labeled the hTR, hTERT, and telomeres with fluorescent markers and examined them using fluorescence microscopy and compared to cells transfected with wild type hTERT and hTR. The telomerase components in the cells transfected with mutants displayed localization phenotypes different from the wild

type cells, suggesting that the mutated regions of the hTERT protein are important for the localization of the telomerase components to each other and to their site of action, the telomeres.

¹ Tomlinson, R.L., Ziegler, T.D., Supakorndej, T., Terns, R.M., and Terns, M.P. (2005) Cell cycle regulated trafficking of human telomerase to telomeres. *Molecular Biology of the Cell*, 17(2):955-65.

Modeling HLHS: Living with Half a Heart

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Hypoplastic Left Heart Syndrome (HLHS) is a mutation resulting in the underdevelopment of the left side of the heart, including the aorta, aortic valve, left ventricle and mitral valve, leaving it unable to circulate blood effectively. Newborns may show no symptoms at first, but will soon have serious medical problems when the ductus arteriosus closes, with death ensuing if no treatment is available. However, HLHS can be treated effectively by a series of palliative surgeries, the first of which is an operation to put in place a right ventricle-pulmonary artery (RV-PA) shunt, known as the Norwood procedure, and the last of which being a total cavopulmonary connection, known as a Fontan operation. Currently, there are not any working models of a HLHS heart or of a heart in any phase of recovery. Therefore, the purpose of this study was to create a working computer model for the atrial pressures of a normal heart, a HLHS heart, and a heart in various phases of recovery. The model is an extension of the 1997 Hannon and Ruth STELLA heart model. A key feature of our model is the incorporation of the Hogkin-Huxley action potential model to control the heart beat. With our model, physicians and scientists can better understand the conditions of HLHS, enabling the creation of better treatment.

Novel Enzyme

Whitney Boland

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Paenibacillus amylolyticus C27 was isolated from the hindgut of *Tipula abdominalis* and found to produce lignocellulose-degrading enzymes. A library was constructed with C27 genomic DNA for heterologous expression of biological characteristics in *Escherichia coli* to identify genes encoding pectinases, xylanases, and cellulases. Pel B, the gene discovered, encodes a 392 amino acid protein which is a novel pectinase. Pel B is an unusual pectate lyase that is able to breakdown highly methylated pectin, as well as polygalacturonate. Although Pel B showed the most activity on polygalacturonic acid, it was still able to obtain 26% and 3.5% of its maximum activity on 8.50% and 90% methylated pectin, respectively. The optima were pH 9.5, 55°C, and 0.5 mM CaCl₂, and CaCl₂ was required for the enzymatic activity. Pel B is a subclass of the pectate lyase family 1 and shows no significant similarity to any known enzyme. It shows highest identity of only 27% to pectate lyase of *Thermotoga maritime* MSB8. The degradation of pectin-rich sugar beet pulp by Pel B was demonstrated by measuring the number of small chain oligogalacturonides. In order to investigate the use of Pel B in lignocellulose fermentations, *E. coli* strain JP29 was constructed using ethanologen *E. coli* LY40A expressing Pel B on a plasmid, and the production of ethanol will be quantified to demonstrate the use of Pel B in lignocellulose biomass conversion to ethanol fuel.

West Nile Virus in New York City: Using Birds as an Indicator of Spatio-Temporal Distribution

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West Nile Virus (WNV) first appeared in the United States in New York City in 1999 and has since then spread to almost every contiguous state. WNV has become endemic in the city of New York and continues to pose a health threat to the area. This project uses the distribution of WNV sero-positive dead birds to determine 1) what landcover types are positively or negatively associated with WNV positive bird

distribution, 2) which environmental covariates, such as temperature, rainfall, and elevation, significantly influence the distribution of WNV positive birds, and 3) what combination of these factors can be used to form an early warning system for WNV outbreaks in New York City. The landcover analysis was performed using a Chi-squared test comparing each of 11 landcover types. We found that significantly more WNV positive birds were reported in low-intensity developed areas and wetlands than were expected, and significantly less were reported in high-intensity developed areas than were expected. The covariate analysis will involve the use of boosted regression trees, which will show the relative influence of each environmental factor on the spatio-temporal distribution of WNV positive birds. These analyses will allow us to combine significant spatial and temporal covariates to provide an early warning system for New York City based on when and where outbreaks have occurred in previous years. Such a system would not only help prevent human infection in New York City, but could also be applied to other highly urbanized areas in the United States.

***Hamelia patens*: A Steady State Resource**

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Hamelia patens, a steady state floral resource, is found interspersed within sustainable shade-grown coffee (*Coffea arabica*) farms. Due to *H. patens*' continuous flower production, it has the potential to play a crucial role in the biodiversity conservation of its pollinators, predominantly native bees and hummingbirds. Most of these bees also use nectar and pollen from coffee flowers, but due to short-lived coffee flower production, the constant availability of *H. patens* floral resources may be important for maintaining these pollinators within coffee plantations. To investigate the impact of a steady state floral resource on pollinator communities, bee and hummingbird abundance and species richness indices were tracked on two types of farms, some with a rich resource patch of *H. patens* (10+ individuals) and some without a

rich resource patch of *H. patens* (1 individual). Previous research suggests that farms with rich resource patches of *H. patens* will have greater diversity and abundance of pollinators than on farms without *H. patens*. In San Luis de Monteverde, Costa Rica, mobile potted basil plants and hummingbird feeders were used to evaluate differences in the abundance and species richness of bees and hummingbirds on these two types of farms. In concordance to my predictions, results show that both bee abundance and diversity were greater on farms with *H. patens*. However, hummingbird abundance was greater on farms without *H. patens* and there was no difference in hummingbird diversity between the two farms. This result may differ from our predictions because large foraging ranges, such as those of hummingbirds, may be resistant to temporally stable resources. Because *H. patens* does have a positive impact on bee pollinator communities, steady state floral resources can be useful for crop production, land management practices, and biodiversity conservation.

In The Field: Understanding Science Through The Book Arts

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The work I find most fascinating is that of scientists, as it tends to remain a large mystery to me, a student of the fine arts. I recognize the importance of what these people learn and do, but I know that, ultimately, it is a field I will

never completely understand. It is with this in mind that I am exploring the idea of creating artwork that begins with the tools and artifacts of the world of science. More specifically, I am taking the field and lab books of students and professors of science and deconstructing them, reducing them to their basic parts. The calculations and notations within the books were once essential and significant—albeit cryptic to me—but without their bindings and order their meaning is erased, thus reducing them to their inherent visual structure. I am interested in how the physical remnants of the mental process become an abstract field of mark-making, and it is this field that I respond to, reworking and building upon it until I have reconstructed the journal in a new fashion that combines the mystery of the science with my attempts to understand it. The finished product is also a field book, but it is completely transformed; choices were made based upon visual aesthetics rather than facts and practicality. Throughout the process, I am reminded of the impact science has on how we perceive the world around us, but also of the impact art has on how we understand that science.

Watershed Land Use Effects on Carbon Processing in Streams

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Detrital carbon in the form of dead leaves and wood is a significant food resource in aquatic ecosystems. Breakdown, or processing, of carbon affects energy flow to higher trophic levels. Land use changes such as urbanization result in increased runoff of nutrients and toxicants to streams, as well as alter hydrology and increase temperatures, which can affect microbial processing of carbon. The effects of urbanization on carbon processing (+ or -) have been mixed in other studies, as overriding factors may be land-use specific. Our study tested whether carbon processing rates were different among streams that differed in watershed urbanization. We measured breakdown and associated microbial respiration rates across an urban land use gradient. Eleven

sites were chosen on six streams in Clarke County, Georgia, USA. Sites were classified as urban, suburban, industrial, or forested based on surrounding land use and impervious surface cover. Strips of white oak (*Quercus alba*) veneer were fixed to the streambed at each site. Veneers were collected at 50, 95 and 160 days after deployment. At each collection, rates of microbial respiration and ash-free dry mass (AFDM) were measured to quantify microbial activity and wood breakdown rates. Data will be analyzed using ANCOVA with temperature as a covariate. Initial results indicate that microbial respiration and breakdown rates are greatest at the suburban sites. Since rates of breakdown and respiration indicate the rate at which carbon is transformed, mobilized, and made available to other organisms, our results suggest that watershed urbanization affects important ecosystem functions in streams.

Validity of English

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As an undergraduate major, English literature is relatively new. As the "vernacular," the English language and literature written in it has suffered historically from comparison with classical literature; not until the late nineteenth century did universities begin to consider English literature a subject worthy of academic study, and even today critics on both the right and left of the political spectrum question its value within the university (e.g., Gerald Graff, *Professing Literature*; Michael Bérubé, *What's Liberal about the Liberal Arts*). On the one hand, English departments across the United States have inherited the responsibility of cultivating individuals who will become responsible citizens, citizens who will then represent the opinions, ideas, or thoughts of their education and who will spread this cultural development throughout their communities, states, and nation. On the other hand, such results are intangible, unquantifiable, and only elliptically lucrative. Writer-scholars such as Matthew Arnold, Percy Shelley, and David Lodge have, in the past, defended the role of

literature and the arts in society and students' exposure to the canon of art and culture. But because of recent national budget cuts, universities have been pressured to decide which departments to cut, and right-wing critics have challenged the English department specifically concerning "queer theory" and "feminism." An argument to defend these areas of criticism, specifically from two English students' points of view, is therefore necessary. Many defenders of literature describe a future in which the creators of art and their empathizers are uniquely able to understand how to interact with and interpret society. As Bérubé argues, modern English education requires an understanding of the minority (because of literature's capacity to make us empathize with other minds), and our study traces the variety of efforts and pressures that pit this understanding against traditional conceptions of the canon of literature. Our paper reminds us that a cohesive population depends upon opposing voices. Our study therefore emphasizes literature that celebrates the culture and life of a variety of minority groups and the ability of the story to forge relationships. We will argue that English literature's ability to suggest various meanings to life and concentrate upon the interactions between people rises above the discrimination it receives within the academic world. This attribute, what the poet John Keats called "negative capability," is what makes the study of English literature essential and valid as an option for all undergraduates.

Determination of the Prevalence of Avian Paramyxovirus-1 in Wintering Populations of Double-Crested Cormorants

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Virulent Newcastle disease (VND), caused by certain strains of avian paramyxovirus serotype-1 (APMV-1), has resulted in significant mortality among breeding populations of double-crested cormorants (*Phalacrocorax auritus*). Strains of virus causing VND are actively excluded from domestic poultry due to the severe economic impacts. Virulent strains

have been isolated from cormorants wintering in Savannah, Georgia, in contradiction to negative results produced by a survey of cormorants from Alabama, Florida, and Mississippi. The goals of this research are to further expand the surveillance of cormorants for APMV-1 and to compare any isolates obtained to those previously described. It is hypothesized that the prevalence of APMV-1 carriers among wintering cormorants will vary proportional to the severity of outbreaks in the previous summer. Viruses will be isolated by inoculating embryonated chicken eggs with cloacal swabs from cormorants. Hemagglutinating activity assays will be used to quantify the presence of the virus, and isolated viruses will be identified using polymerase chain reaction assays with sequencing of the products. These methods amplify the virus, giving this approach higher sensitivity than the previous study. Higher sensitivity to the virus is expected to increase the ability to yield positive results. Environmental samples of voided feces have been collected from the Savannah site. Additional samples will include cloacal swabs from cormorants actively collected for this project, cormorants killed through depredation permits, and voided feces. As carriers of APMV-1, cormorants potentially serve as a source of virus transmission to domesticated poultry flocks with the possibility of major economic consequences.

Sequencing and Expression of Infectious Bronchitis Virus Nucleocapsid Protein Gene for Use in an Infectious Clone

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This project coincides with a larger goal of developing a viral infectious clone for infectious bronchitis virus (IBV) a coronavirus that causes a highly infectious upper-respiratory disease in commercial chickens. An infectious clone is used to recreate infectious virus using nucleic acids in the laboratory. Infectious clones are easily manipulated and thus are useful in the study of viral processes and infection. The purpose of this research is to clone and verify the genetic sequence of the nucleocapsid gene of

IBV and to express that protein in cell culture. The nucleocapsid protein is necessary to protect the viral RNA obtained from the infectious clone so that the virus can be regenerated. The methods outlined below were designed to successfully generate the nucleocapsid protein for use in rescuing the IBV infectious clone. Reverse transcriptase polymerase chain reaction (RT-PCR) is a method for synthesizing and generating (amplifying) many copies of DNA from an RNA template. The nucleocapsid gene from the Mass 41 strain of IBV was amplified using RT-PCR, inserted into a bacterial plasmid (TOPO vector), and transformed into *Escherichia coli* cells. The nucleocapsid gene in the TOPO vector was sequenced using specifically designed primers to verify the integrity and orientation of the gene within the plasmid, which is important for subsequent expression of the nucleocapsid protein. A continuous cell line (293T cells) will be used to express the nucleocapsid protein in the laboratory. An immunofluorescent assay using antibodies directed against the nucleocapsid protein will verify protein expression in the cells. Successful expression of the nucleocapsid protein is the first step in regenerating IBV from an infectious clone.

Changes in Cooking and Eating Practices of Griffin, Georgia

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As Southern culture undergoes change due to urbanization, it is important to note the differences between aspects of today's Southern lifestyle and the older traditions and customs. The Linguistic Atlas Program provides linguistic data from all areas of the United States, with interviews that contain cultural information concerning practices of Americans from the late nineteenth century through the late twentieth century. In the interest of time, I have narrowed my focus to the cooking and eating practices of Griffin, Georgia, a Southern mill town that is beginning to move from a rigid social structure containing mainly mill villagers and farmers to a structure that contains more commuter workers

and townspeople. To provide modern perspective, approximately eight current Griffin residents are interviewed and tape-recorded about their culinary habits. Then the data are compared to the Atlas Project's Griffin, GA interviews from the 1970s. These residents are between the ages of 35 and 80 so that they may attest to changes that have occurred in diet over time, as well as provide personal accounts of how changes in the social structure of Griffin have affected their culinary habits.

Dispersion of Carbon Nanotubes in Aqueous Solution

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The protozoan parasite, *Ophrocystis elektroscirrha*, infects monarch butterflies (*Danaus plexippus*). Parasite infection reduces fitness and longevity in monarch butterfly hosts, with higher parasite loads resulting in shorter host life spans. Because high infection levels (i.e., high parasite density) cause high virulence within the host, we tested if high infection loads are also advantageous to the parasite through increased transmission. Monarch larvae were infected with various doses of parasites and reared to adulthood, and parasite spores on milkweed leaves and eggs were counted. Results showed that heavily infected monarchs transmitted more spores onto leaves and eggs than lightly infected monarchs. When females laid eggs, they also transmitted more spores onto leaves than when they did not lay eggs. Spore counts taken from two dates did not significantly differ, suggesting that once a host is infected, the parasite can be transmitted over a certain time interval without decreasing in number. These results suggest that parasites require a high level of infection to transmit most effectively, and that host health deterioration is an unavoidable cost to parasite survival. This study supports a long-held theory in evolutionary biology that parasite virulence can evolve as a trade-off of parasites optimizing their fitness.

SONAR and Art: The Application of Sound to Underwater Sculpture

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While the use of the sound sculpture in contemporary art has existed since at least the beginning of the twentieth century, the application of SONAR, in its use as an audio and visual medium, has been largely ignored. The attempt of this research will be first to engineer an effective method of extracting and translating the audio data collected by the SONAR device, and second to apply this data in a meaningful way in the creation of a visual image. This will be accomplished by extracting the raw data from the collection device and converting them into an easily parsed data format. Additionally, special importance will be placed on the transformation of this audio data into sound that properly mirrors the image being displayed. That is, to create both a visual image as well as an algorithmically generated unique soundtrack for the subject. As the current method of displaying the particular type of SONAR data being collected for the research require proprietary programs, offering a universally recognizable translation of this data will be valuable for not only those wishing to use SONAR data for future artistic projects but also researchers who use the data in their own investigations.

Use of Cholera as a Metaphor in *Death in Venice*: Health Administrational Aspects and Gustav Aschenbach's Journey

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This paper explores the relationship between the changes enacted by the deadly, widespread nature of cholera and the use of cholera as a metaphor in the novella *Death in Venice* to parallel the main character's moral decline. By examining the European history of government involvement in public health, one gains better insight into the historical context of Mann's time, the early part of the twentieth century.

Additionally, close inspection of the novella's text and literary articles suggested multiple interpretations of the cholera metaphor. The change Gustav Aschenbach undergoes in *Venice* relates to the physical degradation of a cholera patient and the way the world learned to cope with cholera. In the same way that cholera significantly bettered health administration at the cost of millions of lives, Aschenbach's stay in Venice allows him to discover a morally questionable, alternative lifestyle, which ironically leads him to the peak of his literary career. This intensive analysis proves the multi-layered nature of the cholera metaphor in its description of Aschenbach's development and also establishes that beneficial elements can arise from the most tragic events. The paper showcases the drastic changes an individual can undergo under the influence of desire and delves into the intrinsic aspects of human nature to examine whether moral sacrifice is necessary for art's sake.

Towards Generating a *C. elegans* Cell Line: Deregulating the Seam Cell Division Pattern by Inactivating Genes Involved in Cell Differentiation

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The nematode *C. elegans* is an important genetic model organism. In the past six years, three noble prizes have been awarded to scientists working with this organism. The use of *C. elegans* as a biomedical model, however, has been held back by the absence of a *C. elegans* cell line. A cell line allows the growth of a particular type of cell in tissue culture and the study of specific cells of interest with greater efficiency. Human tissue culture cells are generally isolated from either cancers or from stem cells. To generate a cell line in *C. elegans*, we focus on the adult stem cells called seam cells, which have the potential to be manipulated into generating a cell line. A cell line requires continuous proliferation of seam cells, so I am testing whether the inactivation of genes known to regulate normal cell differentiation will lead to continuous seam cell proliferation. These

genes are the cell-cycle regulators *cul-1*, *lin-23*, and *cki-1*, the tumor suppressor *lin-35*, the transcription factors *rnt-1*, *bro-1*, *lin-26*, *elt-5*, and the terminal fate control gene *pop-1*. I am inactivating these genes with RNA-mediated interference (RNAi). Seam cells are tagged with a vector that expresses Green Fluorescence Protein (GFP) for their visualization with a fluorescence microscope. The gene inactivation that produces the highest seam cell counts will be used as a starting point for making a *C. elegans* seam cell line—an invaluable tool for gaining a better understanding of the regulation pathway of adult stem cells.

Zero-Tolerance Illicit Drug Dependence Policy in the United States Military: A Need for Revision

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The U.S. military operates on a zero-tolerance illicit drug use policy, categorizing drug users as lacking potential for sustained service and calling for their immediate discharge. This policy extends to all military personnel, including those who self-report their drug dependence. The military's policy offers no potential for re-entry and, therefore, no encouragement to seek assistance via self-report. Considering that 15 percent of Iraq and Afghanistan veterans seen at the country's largest VA in Houston, Texas are diagnosed as drug dependent upon the completion of their service, the need for this revision is apparent. If the military suspended those who self-report rather than immediately discharging them, the potential for rehabilitation and sustained service might be realized. The suspension would follow the rehabilitation model of Employee Assistance Programs, utilized by more than 80 percent of Fortune 1000 corporations. After self-reporters successfully complete drug treatment, they can continue their military careers under strict performance supervision and routine drug testing. The Department of Defense would implement this policy across all branches. An expected benefit is the improved well-being of military personnel who may have begun to self-

medicate in response to their high-stress environment. Currently, the immediate discharge policy frees the military from caring for outcomes for which research shows it may have been responsible and instead places the burden of care on civilian society. Further benefits include the increased safety of those who could be potentially harmed by drug using behavior and the improved security of military families at home.

Wing Morphology, Flight Ability, and Immune Measures in Monarch Butterflies

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Monarch butterflies (*Danaus plexippus*) are well-known for their spectacular migrations along the northeastern coast of North America to over-wintering sites in Central America. In response to wounds and infections, they have a complex immune system that includes the production of hemocytes (insect immune cells) and phenoloxidase (PO) activity, which releases melanin, an important compound in immune defense also responsible for dark pigment. Bioenergetic costs associated with flight and infection are documented, but potential trade-offs among flight ability, immunity, and wing morphology are unknown. Hemocyte samples were obtained from the same individuals during larval and adult stages. Prior to flight trials, adult monarchs were scanned on a flat-bed scanner to obtain wing morphology measures (wing area, loading, aspect ratio, and color characteristics). Monarchs were tested for flight ability using a nearly friction-less flight mill; flight time, distance, initial and final velocity were measured. Preliminary analysis showed no significance between flight ability (total distance, total time, average speed, proportion of mass loss) and immune measures (hemocyte counts and PO activity), and between flight ability and most measures of wing morphology. However, there were significant relationships between average speed and proportion of black on wings, and between adult hemocyte counts and proportion and density of black. Additionally, a combination with two other data

sets showed a significant relationship between total flight distance and orange hue in wings. This has strong suggestions for sexual differences in flight ability, as males have a higher proportion of black and “redder” hues than females. Final data analysis will expound upon the costs and benefits of flight ability and wing morphology with implications for overall fitness of migratory populations.

Distinct Processing Activities Are Associated with the *Trypanosoma brucei* CaaX Proteases

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Many proteins undergo a series of post-translational modifications required for proper enzymatic function. Proteins possessing a tetrapeptide CaaX motif (C=cysteine, α =aliphatic amino acid, and X=one of several amino acids) undergo attachment of an isoprenoid lipid, proteolytic cleavage, and carboxymethylation. This process is conserved across all eukaryotic organisms. This study investigates the activities of *Trypanosoma brucei* Rce1 and Ste24, enzymes responsible for proteolytic cleavage of CaaX proteins in this parasite. We establish that TbRce1 and TbSte24 can be heterologously expressed in *Saccharomyces cerevisiae* in functional form, as evident by their ability to promote maturation of the yeast mating pheromone, which is itself a CaaX protein. Using this *in vivo* assay and a-factor CaaX motif variants, TbRce1 and TbSte24 were deemed to possess partially overlapping substrate specificities similar, but not identical to, their fungal and human counterparts. We further establish the *in vitro* sensitivity of TbRce1 and TbSte24 to small molecules previously identified as inhibitors of the yeast and human CaaX proteases, and demonstrate that a subset of these compounds disrupts TbRce1-dependent localization of a GFP-Ras2p reporter in yeast. One compound in particular was identified that inhibited TbRce1 but not HsRce1. These results support the idea that TbRce1 may be selectively inhibited over the human isoform, further suggesting this

enzyme as an effective therapeutic target in trypanosomal infections. This study also demonstrates the conserved nature of CaaX proteases across eukaryotes and supports the potential use of small molecule CaaX protease inhibitors as tools for cell biological studies of CaaX protein trafficking.

Electoral Violence in Kenya: 1997–2008

Chris Chiego – CURO Scholar

Dr. John Morrow, Department of History, University of Georgia

The last three times Kenyans went to the polls for relatively free and fair elections, political violence rocked the nation. Each time, the pattern of violence was different. In 1997 and 2002, most of the violence was concentrated before the election, while in 2007-08 most of the violence occurred after the election. The violence also varied from election to election by region, targeted groups, and even method of violence. While many press reports and publications blamed ethnicity for fanning the flames of violence, economic inequalities have been relatively ignored as an explanation. Using data that I collected through fieldwork in Kenya, including government reports, NGO reports, media reports, and firsthand accounts, I will construct a database of electoral-related violence covering the elections of 1997, 2002, and 2007. From this database and other information such as government reports, I will attempt to demonstrate that economic issues played a major role in Kenya’s history of electoral violence. Looking at areas with excessively high poverty rates and noting the socio-economic status of persons involved in violence will illuminate the larger patterns behind the violence.

Social Media Use and Belonging

Elise Choe

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Classic and contemporary theorists in social psychology argue that humans have a fundamental need to form and maintain positive, lasting relationships with others (Baumeister & Leary, 1995; Maslow, 1954). Given humans’

intrinsic need to belong, individuals are motivated to form new social bonds, repair broken bonds, or otherwise reconstrue their social world in order to maintain a sense of connection (e.g., Gardner, Pickett, & Knowles, 2005). The present investigation explores individuals' use of social media and technology (e.g., social networking sites, blogs, online communities, and online gaming) as means of fulfilling belonging needs. In our initial study, we used a survey design to collect exploratory data pertaining to individuals' belonging needs, personality differences, loneliness, social anxiety, and frequency and type of media and technology use. We expect that individuals with a chronically high need to belong will be more likely to seek out connections via the internet than those low in this need, but this effect may be moderated by social anxiety or personality differences such as introversion. In the initial study it was found that there is a positive correlation between high Facebook usage and high extroversion. The other data were found to be insignificant. The small number of participants and the type of technology the participants used was limited. Therefore, an upcoming follow-up study, with college students, will be targeting a more specific population and will more directly compare the frequency and consequences of social media and technology use and that of in-person social interaction to determine if there is optimal ratio of computer-mediated to in-person communication for psychological well-being.

Intoxicating Misery

Caitlin Christopher
Prof. Bala Sarasvati, Department of Dance,
University of Georgia

The solo *Intoxicating Misery* that I will present originated from a choreographic study using crafting devices that I did in my composition course. Although my piece was based on a character study of a woman trapped by her own emotion, I still wanted the choreography to be technical and athletic. Sometimes choreographers sacrifice line and shape in order to focus on the emotion they are trying to portray. I wanted the movement to be as

complex as the emotions behind the lyrics of Aretha Franklin's "Never Loved a Man" which possesses elements of tragedy, hatred, and self-loathing but remains passionate and sensual. My goal was to show that one does not have to forget form to illustrate an emotion. With the help of some of the crafting devices such as augmentation, diminution, mirroring, transposition, and inversion, I was able to develop a solo that had a cohesive, specific style that remains technical while illustrating the complexity and depth of human emotion.

Why So – Exploring Non Conventional Roles of the Male and Female in Dance Partnering

Marie Clark and Alexandru Muresan
Prof. Bala Sarasvati, Department of Dance,
University of Georgia

Why So was originally created as part of a dance composition course. The focus of this creation was to move away from the traditional roles given to males and females in dance. Instead of developing movement centered on a loving or sexual relationship, the initial choreography was inspired by a fight. The choreographers found motivation from many fight styles, including mixed martial arts and boxing. Movement was actualized from this motivation and brought together with other pedestrian movement as well as limited traditional dance movement to create the duet. The male and female figures participating in this piece do not illustrate the age-old roles, but instead represent two sides of a struggle in a single person.

Vesicular Stomatitis Virus in Infected Cattle

Caroline Colden
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University of Georgia

The Vesicular Stomatitis Virus (VSV) is a single, negative-stranded arbovirus in the Family Rhabdoviridae. VSV infects cattle, pigs, and horses in specific tissues, primarily the coronary bands (CB) of feet, tongue, planum rostrale, planum nasale, and teats, causing vesicular (blistering) lesions. Infection can have debilitating effects on the animals, posing a huge threat to the food and livestock industry. The

disease can be transmitted via animal-to-animal contact or via insect bite. The pathogenesis of VSV is currently not well understood making it difficult to devise effective control methods. Using molecular techniques, VSV RNA has been shown at the site of the inoculation and draining lymph nodes only, with no subsequent spread. The demonstration of viral proteins via immunohistochemistry (IHC) would allow a more precise viral localization within the tissues, leading to a better understanding of how the virus reaches the draining lymph nodes from the site of inoculation (CB). In this experiment, IHC was used to detect viral protein in the CBs from six steers inoculated via scarification of the CBs with VSV serotype New Jersey. Animals were euthanized at 12, 24, 48, 72, 96, and 120 hours post-infection. Our IHC results demonstrated that virus was effectively replicating to produce viral protein in keratinocytes of the coronary bands. Preliminary results revealed focal and light positive immunohistochemical staining at 12 hours post-infection. As the infection progressed to 24 and 48 hours, positive staining with increased intensity and wider distribution occurred as the lesion became more defined. At 72 and 96-hours post-infection (HPI) IHC staining became less intense, with higher intensity staining more localized in keratinocytes surrounding the vesicle formations. After infection had occurred for 120 hours, however, staining became much more localized to a few areas surrounding the vesicle and with weaker staining intensity. Therefore, this experiment shows the peak of virus replication at the inoculation site is between 24 and 72 HPI. After 96 HPI, mechanisms associated with host response might play a role in keeping VSV from further replication and subsequent spread.

Mandatory Impact Fees: A New Growth Management Strategy for Georgia

Rocky Cole

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Over the past fifty years, urban sprawl has become the predominant form of urban growth in America. While many Americans find sprawl

aesthetically unpleasant, few identify it as the root cause of many growth related problems. Neglected infrastructure, including deferred roadway maintenance, and overcrowded public schools are both negative outcomes associated with unchecked outward expansion. Scholars consistently rank Georgia as one of nation's most sprawling states. Despite the early enactment of growth management legislation, Georgia has largely failed to curtail sprawl. Inherent weaknesses in Georgia's growth management strategy, including rigid political beliefs in local autonomy, continue to cripple the state's management efforts. If Georgia is to limit the negative consequences of sprawl during times of rapid development, a new method for financing capital improvements is necessary. This paper offers a solution to Georgia's growth management problem that will ensure future development pays for itself. Following a brief discussion of the costs of sprawl, survey data collected by the Georgia Municipal Association are used to empirically evaluate sprawl in Georgia. The state's past growth management strategies are then reviewed, and their effectiveness at limiting low-density development evaluated. Interviews with state and local officials supplement the investigation. Finally, the case is made that mandatory impact fees for new development, or one time fees paid by developers to finance the additional infrastructure required (i.e., roads, schools, and sewer lines), can encourage more efficient uses of existing infrastructure without slowing overall growth.

A Season of (Info) Sharing: An Empirical Investigation of Intelligence Reform

Rocky Cole and Chris Chiego

Dr. Loch Johnson, Department of International Affairs, University of Georgia

Following the Iraq weapons of mass destruction (WMD) intelligence failure of 2003, Congress enacted the Intelligence Reform and Terrorism Prevention Act (IRTPA). The legislation reorganized the intelligence community to facilitate greater cross-agency sharing of raw intelligence and more frequent inter-agency cooperation, creating a Director of National

Intelligence and a National Counterterrorism Center. Though IRTPA marginally improved information sharing practices, it failed to address the flaw in the intelligence process which was most responsible for leading policymakers to believe that Iraq had weapons of mass destruction: the threat of consensus thinking, commonly known as groupthink. To test the hypothesis that groupthink played a role in the 2003 Iraq WMD intelligence failure—and that it is not receiving comparable levels of attention from intelligence professionals as information sharing—we conduct an empirical investigation of IRTPA by developing an Intelligence Reform Lexicon, or a dictionary of terms associated with intelligence reform. We use intext computer software to machine code government agency, think tank, and academic literature, as well as Congressional testimony, from 1993 to 2008. We then use the data to derive “Lexicon Scores,” or percent values, of the average amount of annual coverage devoted to specific aspects of intelligence reform. Our results support our hypothesis that groupthink played a role in the recent intelligence failures, and that in order to mitigate the negative affects of groupthink, the intelligence community needs to conduct more extensive academic outreach.

Child Care Foundations: A Model for Employer-Based Child Care Subsidies in Athens-Clarke County, Georgia

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Athens-Clarke Count (ACC), Georgia struggles with a startling poverty rate of 28.3 percent. Defined as one of 91 persistently poor counties in Georgia, ACC has approximately 26,000 residents living in poverty. Fortunately, the community has recently fostered a public discourse on how to reduce poverty through the advocacy group One Athens, including early childhood care as a major issue. Early childhood care and developmental programs have the potential to attack poverty from the bottom up by closing the gap between students as they enter kindergarten. Currently, the cost for families to invest in child care generally

comprises a sizeable percentage of total household income. The insufficient funds currently allocated to child care subsidization in Athens are limiting what low-income families can do to better the lives of their children while still struggling to provide for their households. In an effort to support the working families of ACC, the local government, in a partnership with the Athens area Chamber of Commerce, should engage in an initiative encouraging businesses to provide direct subsidies for child care. The ACC government should provide incentives for companies to participate by utilizing current tax credits available from the state of Georgia and minimal funding from the county. Engaging in the smart business practice of employer-based child care subsidies, companies will achieve a stable labor force in the short term while enriching the employees of the future. This practice will foster a mutually beneficial relationship between employers and laborers through non-monetary benefits, such as increased morale and reduced turnover. It is my aim to construct an effective public policy that has the ability to be applied in Athens. Through interviews, a review of pertinent academic literature, and an analysis of existing programs in other cities, I will construct a program to help employers more widely provide child care in Athens-Clarke County.

Lay Down Your Heart, a Travel Memoir

Rebecca Corey

Prof. Reginald McKnight, Department of English, University of Georgia

This travel memoir is based on a journal kept by Rebecca Corey over her ten-week stay in Tanzania, Africa in the summer of 2006. The author describes her experiences as a primary school teacher at a center for orphaned and impoverished youth, her travel around the country, her reflections on tourism, the volunteer experience, and African culture, and her research on Tanzanian proverbs. This multi-media creative non-fiction piece includes illustrations, photographs, and narrative writing. In her work, Corey addresses the private aspects of travel and self-discovery as well as the broader realms of tourism and global service

initiatives in a developing country. She places her experiences in the wider context of travel and service in Africa, ruminating on the joy, fear, and discovery that characterized her stay in Tanzania. She illustrates the sense of fulfillment created by civic engagement and humanitarian work while also discussing the challenges and frustrations those activities often entail. Corey's work is informed by her concurrent research on the existing body of creative non-fiction and travel writing, as well as her research on the proverbs of Tanzania conducted in June and July of 2006.

Puerto Rican Feminist Thought: Boricua

Celina Correa

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What does the word “Latina” mean? When most feminists (in the USA) think of Latinas, they think of Latina women in the United States, and possibly Mexican women that identify as Chicana. That is a wonderful way to think of Latina women, but it does not represent the entire Latina population. Throughout this essay, the word “Latina” will not be rejected but only expanded. I will break it down in order to show that, although generalizing is necessary, it also can be very problematic for Latinas. I will then turn to Puerto Rican women and demonstrate how such a small island in Latin America/Caribbean, can have over four different self-identities for women and how that relates to the word “Latina.” Examining Puerto Rican feminist thought will demonstrate how Puerto Ricans are part of the overall Latina feminism, as a union, and with intersectionality, all at the same time. I will then emphasize the challenges of dominant discourses within feminism with regards to underrepresented Latinas and how they are and are not seen. I make reference to different scholars and analyze their multicultural feminist thought. This essay is highly significant in the category of Puerto Rican feminist thought because a large portion of Puerto Rican feminists have written mainly in Spanish. My purpose is to shed some light on such topics in English, so that feminists in the dominant discourses continue to develop their access to

such discussions, as well as knowledge of the multiplicity of Latina Feminism.

Marketing the Non-Profit Global Text Project to Universities in Developing Economies

Jessica Craven and Sarah Alongi

Dr. Richard Watson, Department of Management Information Systems, University of Georgia

Mass education has created many opportunities, particularly for the developing world. The Global Text Project aims to build a library of open-source textbooks targeted towards students at universities in developing economies. The open-content Global Text Project library provides affordable educational materials. Issues arise in creating awareness and adoptions of the books by the project's target audience. Thus, marketing efforts for the project involve three traditional channels: Internet, personal selling, and public relations. As a non-profit in the early phases of development, Global Text relies on these three channels through cold contacts derived from a UNESCO global university database, conferences and resulting contacts, and on campus initiatives. Because these channels yielded few results, the Project adopted a revised marketing plan based on the non-profit marketing model using joint venture co-branding with non-governmental organizations, government agencies, and other academic societies. Through co-branding, Global Text aims to combine resources with well-established organizations to further the shared purpose of providing affordable books.

The Project's new marketing plan is focused on universities in Anglophone, politically-stable African countries, including Ethiopia, Lesotho, Botswana, Namibia, Ghana, and South Africa. Success in co-branding with other organizations should increase adoptions of the open-source textbooks.

News in the Black Belt: Teaching Journalists How to Cover Poverty in Persistently Poor Counties

Carolyn Crist – CURO Summer Fellow
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In the 1990s, many larger newsrooms across the nation employed reporters on a “poverty beat” to discuss financial difficulties in their communities. Now, as large newsrooms lay off hundreds of employees and reduce specialized beats, newspapers are increasingly focusing on local communities. As the trend continues, journalists must learn how to convey information through their local identities and sense of place to explain poverty in persistently-poor locations. We pinpointed 14 newspapers in middle and southern Georgia that are located in generationally-poor areas and attempted to discern whether a workshop would be beneficial to teach them how to cover poverty in interesting and relevant articles. Because poverty affects all aspects of the community—crime, health, business and education—we propose coverage should be taught to all reporters as a “horizontal” beat to be covered in all areas rather than as a “vertical” beat that is given only to one reporter. Through articles explaining history, narratives, and tradition, reporters can draw in readers and educate them about the effects of poverty in their community. National statistics, surveys, and legislation can be used at a local level to explain poverty trends, and this paper gives specific ideas to incorporate poverty coverage in beats across the newsroom. The 14 newspapers observed in this study were divided on how they currently acknowledge and cover poverty, and each must find its own way to correctly cover the issue in its market. All agreed on one idea - in times of economic recession, a workshop that would cost money and take time from the office is not ideal. We propose to create a Web site in fall 2009 that will teach newspapers from all backgrounds and paths how to cover poverty simply in their communities through several stories that can be published at any time. If followed, increased poverty coverage will reflect local struggles with the diminished economy, highlight areas where

the local government can aid community members, decrease stereotypes associated with poverty, and increase understanding about the poverty cycle usually located just down-the-street.

Meat Out of the Eater

Jordan Dalton
Mr. Mark Callahan, Artistic Director, Ideas for Creative Exploration, University of Georgia

Meat Out of the Eater is a collaborative performance with Lara Glenum, a poet and PhD candidate in UGA’s Creative Writing Program, Cal Clements, a pataphysician, experimental theater director, and founder of a local yoga studio, and Mia Mäkilä, a Swedish painter. The work is based around and named after the second half of Lara’s most recent book, *Maximum Gaga*, which is a hybrid poem-play retelling the myth of Pasiphäe, the wife of King Minos, who enlists the help of the inventor Daedalus to construct a machine to assist her in copulating with a bull. From this act is born the monstrous hybrid, the Minotaur. The centerpiece of this multimedia performance is an interpretation of Daedalus’s epic machine. A cart, like that of a merchant in the market, but covered in and with strange instruments that seem to exist somewhere between “of torture” and “of sound-making” appears a wardolly. Bone rattles, metal bowls, and wire strings cover the cart, and all are amplified. The musicians who use this cart for improvisatory (and most likely other, more menacing) purposes seem somehow to be part of the machine. Tubes and tethers of cable that seem strangely alive tie them to the wardolly, and the cart and the musicians are similarly tied to the room of the performance itself. The poet herself is also involved. Her words echo throughout the space and provide an improvisatory framework to which the musicians respond and accompany. She, too, is tethered. No one seems to be free from the giant, pulsating, noisy machine. Moving images are on the walls. They are tied to the poet’s language; they are more literal visual representations of the words and sounds that fill the space. An animation, Mia’s commission from across an ocean, is a particular highlight,

and even the room's convulsions seem to pause for a minute to watch. Everyone, including the room, is costumed. The sort of garb that makes one afraid that, with each layer peeled off of the body, thousands more, each one more disturbing than the last, lie waiting to be revealed. Tubes, cables, and piles of unidentifiable matter litter the floor of the space.

Late Ming Dynasty Jingdezhen Ceramics in a Changing Economic and Cultural Context

Amy Davis

Dr. Ari Levine, Department of History,
University of Georgia

An internationally respected art form, Chinese ceramics provide an interesting starting point for any art historical research. This research investigated an important time of change in China's ceramic history. During the late Ming dynasty, economic decline led to the end of imperial patronage of Jingdezhen kilns, forcing potters to find new consumer markets. Careful examination of the functionality and formal qualities of several specific Jingdezhen export wares, along with a study of the symbolism found in ceramic surface decoration, indicates probable uses and markets for porcelain produced during the late Ming dynasty. An in depth study of late Ming dynasty culture and Jingdezhen porcelain production practices also indicated that many artisans made works specifically targeted to the cultural values and customs of new national and international consumers. By adapting to needs and demands of new consumer groups, Jingdezhen potters were able to thrive despite a complete loss of imperial patronage. Because of the flexibility of the porcelain industry, Jingdezhen emerged as the world's major center for export ceramics. By studying the history of Chinese ceramic art, one can gain a greater understanding of contemporary Chinese art. Contemporary Chinese art is heavily influenced by both China's past and China's current socio-political issues. A better understanding of how China views her own socio-political situation can thus be obtained from Chinese art in antiquity. Given China's position as a growing major political

power, it is essential to understand China's own views about her place in the world.

Long-Range Retrograde Neurotrophic Signaling in Mouse Sympathetic Neurons

Logan Davis – CURO Summer Fellow

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Developing vertebrate neurons depend on target-derived growth factors for survival and neurotrophic support. The precise molecular mechanisms underlying long-range transduction of survival and trophic signals remain unclear. When nerve growth factor (NGF) is withdrawn from sympathetic neurons *in vitro*, a complex intracellular molecular cascade results, leading to caspase-mediated protein degradation and death. A dramatic increase in reactive oxygen species (ROS) that is a critical component of the apoptotic cascade takes place in these cells soon after withdrawal. Neurons can be rescued by late re-addition of NGF which rapidly suppresses ROS production. This suppression is evidence of a rapid survival signal. I will plate mouse superior cervical ganglion (SCG) neurons in novel microfluidic chambers developed at the University of California, Irvine, in which soma are separated from their distal axons. Cells will be deprived of NGF in both somal and distal axon compartments. Somatic ROS levels will be determined by confocal microscopic imaging of neurons loaded with CM-H₂DCFDA, a cell-permeant indicator of ROS that is non-fluorescent until oxidation occurs. An immediate decrease in somatic ROS production after re-addition of NGF to the distal axon compartment would offer evidence that a *long-distance* rapid survival signal takes place in sympathetic neurons. The rate of movement of the signal may allude to underlying mechanisms. Many neuropathologies will be better understood by the clarification of mechanisms underlying survival signaling, and this research could have important clinical ramifications.

Moods, Emotions, and Occupational Identities: A Test of Affect Control Theory

Long Doan – CURO Scholar

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Affect control theory is a quantified theory that predicts the actions taken by individuals to maintain their cultural identities in certain situations. It also predicts likely emotions due to such interactions. Affect control theory makes its predictions based on the three-dimensional numerical profile (EPA) of actors, behaviors, settings, and emotions. Most tests of the theory to date have taken place in the laboratory or idiosyncratic field settings. This paper aims to accomplish two things: to find out whether occupational identities have become so salient that they can be sole predictors of emotion and to test the effectiveness of affect control theory in predicting those emotions using nationally representative data. Using the 1996 General Social Survey (GSS) as empirical data, the author analyzed the correlation between the EPA values of one of thirteen moods and emotions and the EPA values of ninety-seven occupational identities. To answer the second research question, the author generated characteristic emotions of ninety-seven occupational identities using affect control theory and calculated the geometric distance (deflection) between those characteristic emotions and the thirteen moods and emotions asked in the GSS. The author then analyzed the correlation between the deflection, which represents unlikelihood, and the likelihood of GSS respondents' experience of one of thirteen moods and emotions. Results show that occupational identities do not make good predictors of moods and emotions, but affect control theory increases the significance of those predictions.

Facial Identity Recognition: Perceptual Narrowing From Infancy Through Adulthood

Lauren Doyague, Elizabeth Simpson, and
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Infants experience perceptual narrowing (i.e., a process in which perception starts out broadly tuned to all stimuli and then narrows) months after birth. Our study focused on examining human infants' transition from being "face generalists"—discriminating facial identity for numerous species—to being "face specialists"—becoming experts in discriminating human faces. Our aim was to determine the breadth of human infants' abilities to discriminate the facial identity. To these ends, human 6-month-olds ($N=65$) and adults ($N=30$) were tested to determine whether they discriminated the facial identities of male humans, capuchin monkeys (*Cebus apella*), and sheep (*Ovis aries*). These species are phylogenetically more distantly related to humans than species previously used. The experiment began with a familiarization period, during which infants accumulated 20 seconds of looking to a face, and then a visual paired comparison task assessed their relative interest in the familiar face to the novel face (i.e., by recording eye movements). Adults had a similar familiarization period and then made key press responses to the novel face. Adults had faster and more accurate recognition for the human faces, relative to monkey and sheep faces ($p < .001$). Six-month-olds had longer look durations to the novel faces compared to the familiar faces ($p = .005$). This is noteworthy because this shows that young infants can discriminate facial identity of distantly related species. This shows infants' abilities are broader than previously thought. Moreover, this suggests that with time, infants transition from being "face generalists" to being "face specialists."

The Effects of Corticosterone on Stress-Induced Weight Loss and Corticotrophin Releasing Factor mRNA Expression in the Paraventricular Nucleus of the Hypothalamus

Rachel Doyle

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The majority of people who lose weight have difficulty maintaining the weight loss. Rats lose weight when stressed and never return to the weight of the control group. Stress is sensed by

the paraventricular nucleus of the hypothalamus which releases corticotrophin releasing factor (CRF) activating the hypothalamic-pituitary-adrenal (HPA) axis. The HPA stimulates the adrenal glands to secrete corticosterone. Adrenalectomized rats have had their adrenal glands removed. This study examined the effects of repeated restrained stress on both intact and adrenalectomized rats to examine the effect of changes in corticosterone on weight loss, and on CRF in the hypothalamus. There were six groups of rats consisting of various combinations of repeated restraint, adrenalectomy, and replacement of corticosterone in adrenalectomized rats. The restrained rats were stressed for three hours a day on three consecutive days. Adrenalectomized rats lost half as much weight during restraint as intact or adrenalectomized rats given corticosterone replacement. Non-stressed adrenalectomized rats given corticosterone also lost weight but this weight loss and that in restrained adrenalectomized rats was reversible. Thus, both naturally occurring and injected corticosterone causes weight loss, but stress is needed for the sustained weight loss. In a second set of rats, brains were collected at the end of day two of restraint for in situ hybridization. CRF mRNA expression levels increased in the hypothalamus of adrenalectomized and restrained rats, but there was no effect of corticosterone replacement. Therefore, corticosterone plays a role in sustained weight loss but does not act on hypothalamic CRF mRNA.

Adverse Effects After Administration of an Ionic Iodinated Contrast Media in Dogs

Amanda Farmer

Dr. Erik Hofmeister, Department of Small Animal Medicine, University of Georgia

Ionic iodinated contrast (IIC) media are commonly used in veterinary medicine for contrast-enhanced computed tomography (CT) and can provide significant diagnostic benefits. However, clinical experience has reported hemodynamic alterations, including changes in arterial pressure and heart rate, in a small percentage of dogs following intravenous

administration of the contrast agent. The purpose of the study was to identify and determine the frequency of hemodynamic alterations associated with the administration of IIC media in a large number of anesthetized canine patients. Anesthetic records of clinical patients anesthetized between 2002 and 2008 were searched, and 49 dogs met the inclusion criteria. Values for direct arterial pressure and heart rate were recorded at the time of contrast administration and again during the 15 minute interval following the injection. Results of this study indicated that over 93% of dogs developed some increases or decreases in hemodynamic conditions, and the frequency and intensity of these alterations were considerably higher than those found in previous studies involving both human and animal patients. In addition, over 20% of patients experienced a 20% or more change from baseline mean arterial pressure, and over 12% experienced a 20% or more change from baseline heart rate following contrast media administration. As advanced imaging techniques become more common in veterinary practice, and the administration of IIC media is performed more frequently, an understanding of the frequency and types of reactions following contrast medium administration becomes increasingly valuable.

The Effects of Extubation with Varying Degrees of Endotracheal Tube Cuff Inflation on Endotracheal Fluid Volume in the Dog

Amanda Farmer

Dr. Erik Hofmeister, Department of Small Animal Medicine, University of Georgia

In veterinary medicine, an endotracheal tube (ETT) is frequently used for airway management during anesthesia, and proper inflation of the ETT cuff is critical for patient safety. During extubation, the ETT cuff is routinely deflated before removal so that no trauma is caused to trachea and the larynx. However, if there is significant fluid build up around the tube, the ETT is sometimes removed with the cuff inflated or partially inflated to avoid aspiration of fluid proximal to the cuff. The purpose of this study was to investigate the effective protection against liquid aspiration in canines provided by

the removal of inflated and deflated ETT cuffs. Sixteen female beagle cadavers were orotracheally intubated in lateral recumbency, and the ETT cuffs were inflated to a closing pressure of 20 cm H₂O before barium was introduced anterior to the cuff. The dogs were randomly assigned to an ETT cuff extubation condition of deflated or unchanged from the original closing pressure. After extubation, thoracic radiographs were obtained, and the radiographs were assessed to estimate the amount of barium remaining in the trachea. Results of this study indicated that the dogs in the deflated ETT cuff group had an average of 0.9 mL more residual intratracheal contrast than dogs who were extubated with an inflated ETT cuff. If there is concern about intratracheal fluid buildup during anesthesia, extubation with the cuff inflated will remove contents and may decrease the likelihood of aspiration.

Analysis of the Transcriptional Regulation of Pax6 in the Eye

Amina Farooq

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Pax6 is a member of the paired-family of transcription factors that exhibits a very specific and restricted spatiotemporal expression pattern within the developing eye and nervous system. Incorrect levels of Pax6 expression have been shown to lead to developmental abnormalities. Little is known about the transcriptional mechanisms by which Pax6 expression is regulated. Previous analysis has shown the complexity of Pax6 regulation through the identification of multiple enhancer elements which interact to produce a tight regulation of Pax6 expression. The requirement of certain sequences within Pax6 for expression in various regions of the developing organism has also been demonstrated by targeted sequence deletion studies. We show here that, in addition to the already identified enhancer elements regulating Pax6 in the lens, it appears that a key lens regulatory sequence lies within the downstream regulatory region of Pax6. Immunohistochemistry was used to detect the fluorescence tagged transgene, and demonstrate

that a putative eye regulatory region is necessary for the maintenance of Pax6 expression in lens cells. Using bioinformatic sequence analysis, we demonstrate that the identified downstream regulatory region contains the information needed for correct spatiotemporal expression of Pax6 in the retina. These data shed more light on the specific mechanisms governing Pax6 expression within the eye, by showing the differential regulation of Pax6 in the lens relative to other structures of the developing eye. Further elucidation of the precise regulatory mechanisms of a key developmental gene like Pax6 will provide crucial information for those working to therapeutically clone ocular tissue in an effort to provide effective treatment for individuals with ocular disorders.

Studying the Genetic Diversity of the Var2csa Gene

Opeoluwa Fawole – CURO Apprentice

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Plasmodium falciparum is a parasite transmitted from mosquitoes to humans that causes the most severe incidences of malaria. Our research focuses on placental-associated malaria, which is mediated by the var2csa gene product found in parasites that infect pregnant women in Africa. Our goal is to study the gene sequence diversity of var2csa among various parasite isolates extracted from infected pregnant women. We expect to differentiate regions of variability and conservation among the var2csa gene sequences and use these data to ultimately predict which areas can be presented by human leukocyte antigen class II molecules. In our study, we have used placental blood samples obtained from pregnant women infected with malaria in Kenya. We use PCR to amplify a region of the var2csa gene and then employ a cloning reaction to find and isolate the unique sequences for analysis. So far, we have 68 sequences from 6 placental blood samples. After aligning and comparing the regions, we analyze the diversity among the gene sequences. Initial analysis has shown that there is tremendous diversity of the sequences, that sequences from a single patient are more similar than those

between patients, and that the predicted class II epitopes (areas that can be recognized by an immunological agent) fall mostly in conserved regions. Through our studies, we endeavor to understand the development of immunity to placental malaria.

Catching the Zanies: Italian Acting and English Drama

Katelyn Foley

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This paper will discuss a new reading of Francis Beaumont's English renaissance play *Knight of the Burning Pestle* in light of the Italian renaissance acting style known as commedia dell'arte. During the two decades before *Knight* was written, many Englishmen's sons traveled around Italy, observing the improvisational street performers of commedia dell'arte. On their return, they brought knowledge of this satirical art form with them. With this acting style in mind, Beaumont creates a dialogue between a romantic type of English city comedy and Italian-style improvisation through a scripted scenario "invented" by his merchant-class characters George, Nell, and Rafe. Commedia dell'arte and its English bourgeois counterparts significantly inform Beaumont's satirical commentary within his play. However, very few attempts to correlate the English and Italian renaissance acting styles have been made, and there are no critical studies that discuss improvisation within both forms in relation to Beaumont's *Knight*. Through examination of the play, especially its improvisational scenes; English translations of commedia dell'arte scenarios; accounts of Englishmen traveling in Italy; and improvisational performance traditions, this essay exposes the existence of a vital exchange between Italian acting and English renaissance theatre and culture and discovers a new context for Beaumont's *Knight*, creating a new understanding of satire and comedy within the play.

Approaching Iran: Alternative Diplomacy

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Thirty years after the Iran hostage crisis, American diplomatic relations with Iran remain limited. Political, social, and cultural barriers continue to prevent the emergence of fruitful diplomatic ties between the two nations. The pro-democratic, capitalist United States has attempted to force Iran into the global system by pressuring them with embargoes, sanctions, freezing of Iranian assets in the United States, and the threat of military intervention. These aggressive methods of diplomacy have clearly resulted in a lack of Iranian cooperation. Alternative methods of diplomacy (i.e., third party neutrality, peace talks, etc.) and their effectiveness at solving hostile relations in other parts of the globe will be analyzed and applied to the situation surrounding the United States and Iran. For example, the effectiveness of Jimmy Carter's shuttle diplomacy during the Camp David Peace Accords could be implemented when dealing with the United States-Iran conflict. Egypt and Israel would be replaced by Iran and the United States. Differences could be listed, tradeoffs made, and a consensus reached in the same manner it was in 1978. Also, private, non-publicized peace conferences have proven to be effective in stimulating subtle policy shifts and innovation for new programs of establishing peace. This method, in addition to others, will be applied to Iran and the United States. Though relations with Iran have been heated in recent decades, perhaps an understanding of each other's goals and preferences found through approaching the situation in an alternative manner might be the key to improving the current conflict.

Bipedal Stair Climbing Robots

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My project was in robotics engineering and the objective was to design a robot capable of walking up and down a flight of stairs. This

robot is the first in a series to determine which type of motion, compared to a human type gait, is best for carrying weight up stairs. Other methods will also be built and tested. The robot was bipedal and modeled after a bird in the respect that the knees bend backwards. This complicates some motion associated with walking upstairs. For these robots, because the CPU and servo motors response times are slow, their programming requires that they go from one static position to another and limit transitional speeds between these positions. As a result, the robot motion was designed so its overall center of gravity was always over its base so it would not fall. In other words, it required it be balanced not only at static poses but also in transition between poses. I created two working robots. One climbed a set of six stairs and, once it reached the top, walked down backward, taking the stairs two at a time. The other robot first checked to "see" if the next stair existed before moving. If the stair did not exist, the robot stopped. Because of this, the robot only takes one step at a time, hence its nickname, the "toddler" robot. This project could have implications in search and rescue and military endeavors. These web sites demonstrate the projects:

http://www.engr.uga.edu/people/thai/Bioloid/GeWalkStairs_2/

<http://www.engr.uga.edu/people/thai/Bioloid/ToddlerUp6Steps/>

Analysis of Pectate Lyase Activity in Pectin-Rich Lignocellulosic Biomass Fermentations

Brian Gardner – CURO Scholar

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The dependence on foreign oil in the United States has increased the demand for alternative fuels. Ethanol production from food sources in the United States could create heavy competition for the ultimate utilization of crops. However, ethanol production from pectin-rich lignocellulosic biomass provides a noncompetitive alternative fuel source.

Ethanologen *Escherichia coli* strain JP07 containing the cellobiose phosphotransferase system from *Klebsiella oxytoca* and the alcohol

dehydrogenase and pyruvate decarboxylase from *Zymomonas mobilis* was further engineered to express a pectate lyase from *Erwinia chrysanthemi* (casAB; peIE). To obtain effective secretion of PeIE, the Sec-independent pathway out of genes from *E. chrysanthemi* on the cosmid pCPP2006 were provided to strain JP07 to construct strain JP07C. *E. coli* strains LY40A, JP07, and JP07C possessed significant cellobiase activity in cell lysates, while only strain JP07C demonstrated extracellular pectate lyase activity. Fermentation with sugar beet pulp at very low fungal enzyme loads during saccharification revealed significantly higher ethanol production for LY40A and JP07C compared to the parent strain, *E. coli* KO11. While JP07C ethanol yields were not considerably higher than LY40A, investigation of oligogalacturonide polymerization showed an increased breakdown of biomass to small chain (degree of polymerization ≤ 6) oligogalacturonides. The activity of pectate lyases along with other additional enzymes in ethanol fermentations could lead to more efficient breakdown of noncompetitive substrates to produce fuel ethanol.

H-1B Visa and Green Card Reform

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H-1B visas and green cards for high-skilled foreign workers have had an almost entirely positive effect on the American economy. H-1B visas, which are temporary non-immigrant visas, and green cards, which allow for permanent residence, are being issued at too low of a rate, even considering the decline in growth of the American economy. Support for removing the cap on H-1B visas and green cards will be based on analysis of current literature regarding the shortage of high-skilled labor in America, free market solutions to immigration issues, and the failure of other policies to solve the labor shortage. Due to the need for a greater number of skilled workers, and to lessen the problem of outsourcing, Congress should pass legislation to enact both H-1B visa and green card reform. Currently, corporations like Google and

Microsoft have to get around H-1B visa restrictions by outsourcing jobs overseas. Lifting the cap on H-1B visas will help end this detrimental process. Also, the green card application process should be simplified so H-1B workers who deserve green cards can obtain them. Positive effects will include an increase in the sense of acceptance among H-1B workers, an increase in their sense of civic responsibility, and incorporation of these workers within the tax base. The complaints of American high-skilled workers should be taken seriously and properly addressed, but the potential benefits of H-1B visa and green card reform prove that they outweigh the costs.

Decision-Making Strategies of Wild Capuchin Monkeys

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Wild bearded capuchin monkeys (*Cebus libidinosus*) use stone tools to crack open tough palm nuts to ingest the kernel. Optimal foraging theory recognizes alternative strategies that individuals adopt in complex foraging circumstances to maximize some benefit (e.g., energy intake) or minimize some cost (e.g., risk of predation). Nine monkeys from a well-documented group of wild bearded capuchins were studied over a four-week period in Piauí, Brazil. In this special context, the monkeys are faced with decisions about which nuts to crack and which stones to use. To determine which optimizing strategy (maximize payoff, minimize effort, or maximize the reliability of payoff) that these monkeys use when they crack nuts, they were given a choice of two nuts differing in resistance and two manufactured stones of same volume but different mass. Other experiments allowed the choice of two manufactured stones with one hard nut so that the choice of stone was more important. Monkeys consistently selected the nut that was easier to crack and the heavier stone when the stones differed in weight by at least 500 grams. This study suggests that capuchins are sensitive to properties of stones and nuts, as reflected in their choice of materials for cracking nuts. The findings best match a

strategy to maximize the reliability of payoff. Tool use in these monkeys (and other species, including human ancestors) can be understood from an ecological perspective, as well as from the (more common) cognitive perspective.

The Role of Hirano Bodies and the Amyloid Precursor Protein in Alzheimer's Disease

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Hirano bodies are cellular formations found in patients suffering from neurodegenerative diseases. However, the physiological function of Hirano bodies is not yet understood.

Alzheimer's disease is a degenerative disease characterized by the loss of neurons and formation of plaques in the brain. These plaques primarily consist of the protein amyloid-beta ($A\beta$), which is derived from transmembrane molecule known as the amyloid precursor protein (APP). When cleaved intracellularly, APP forms smaller molecules, including the C31 fragment which has been recently shown to be lethal to neurons. Furthermore, studies have shown that when the C31 protein is mutated, there is a decrease in both $A\beta$ and C31 toxicity (Lu, et al., 2003). Although the mechanism of injury to the cell in Alzheimer's disease is not fully known, the role of APP, $A\beta$, and C31 have been implicated. Because of the observed association between Hirano bodies and Alzheimer's disease, we investigated the relationship between Hirano bodies and the neurotoxic effects of C31. In a previous study, Hirano bodies were shown to sequester and protect against AICD, another neurotoxic fragment of APP (Ha, et al., 2008). In the current study, experiments were conducted in human embryonic kidney (HEK) cells in which Hirano bodies formation was induced with either C31 or a mutated form of C31 (mC31). Cells expressing C31 had an increased rate of death, while cells expressing mC31 were healthy. This observation indicates that cell death was caused by C31-induced neurotoxicity. Further experiments suggest that Hirano bodies are protective against C31-mediated death.

Presence of Apoptosis, as Determined by Immunohistochemistry, in Lymphoid Tissues of Chickens Infected with Strains of Newcastle Disease Virus of Varying Virulence

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Newcastle Disease Virus (NDV) poses many threats to the poultry industry. Whereas low virulence strains often circulate with minimal disease, high virulence strains can rapidly sicken and kill an entire house of chickens. Presence of any virulent viruses within our country will seriously damage our abilities to export chicken meat or live birds. The last outbreak of virulent Newcastle disease in the US happened in California in 2002-2003. That outbreak claimed the lives of 4 million birds, required 8 months to eradicate, and cost over \$300 million dollars to the industry. Because apoptosis, or programmed cell death, serves as a key defense mechanism during viral infections, increased knowledge concerning apoptosis is essential in understanding host-pathogen interactions. Immunohistochemistry (IHC) for active caspase-3, a key enzyme in apoptosis, was done on formalin-fixed, paraffin embedded sections from chickens infected with various strains of NDV. Apoptotic activity was examined in the spleen, thymus, bursa, and intestine. All tissues were harvested at two days post infection. To confirm virus presence, IHC was done for NDV nucleoprotein. Active caspase-3 expression in lymphoid tissue infected with virulent strains was significantly increased when compared to tissue infected with milder strains. Heightened apoptosis in the virulent strains may be a key component of the severe disease manifestations seen. Because severe disease manifestation results in losses to the poultry industry, generating greater understanding of apoptosis in response to NDV infection exists as an important research initiative.

Advance Directive Reform: Reducing Medicare Spending and Increasing Respect of Patients' Rights

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Dr. Claire Robb, Department of Epidemiology & Biostatistics, University of Georgia

Almost every elderly American citizen receives healthcare coverage from Medicare, which continues to expand in size and cost. In 2008, the number of Medicare enrollees was 44,831,390 and the program cost \$300 billion. Often, efforts to contain Medicare costs complicate delivery of health care which reflects the patient's desires. End-of-life care (EOLC) contributes to Medicare spending and results in situations creating obstructions to honoring patients' rights. Through an advance directive (AD), a patient declares healthcare preferences in advance. Because an AD potentially saves money and increases respect of patients' rights, the purpose of this research was to determine the best program for AD implementation. A comprehensive literature review was conducted using databases such as PubMed, EBSCOhost, and LexisNexis Congressional. AD, EOLC, and Medicare policy were compared. Research shows that a lack of national AD policy creates barriers to AD use. Also, the work of Molloy et al. exemplifies the importance of AD education in policy implementation, as patients who received AD education had a decrease of \$1200 for healthcare expenditures. Because of differences concerning views on death, there is a need for AD policy which respects a variety of stances. Research findings call for a policy with two major components: creation of a national AD by the Department of Health and Human Services and federal investment in an AD educational campaign to promote AD use.

Buddha and Uncle Sam: Investigating Contemporary Buddhism in the United States and Its Evolution

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Buddhism, based on the teaching of Siddhartha Gautama, also known as the Awakened One ("Buddha"), has experienced an amazing evolution from its origin four hundred years BCE. Unlike many other religions that utilize supernatural solutions to the suffering in the world, Buddhism uniquely focuses on the individual self as the vehicle for ending this suffering. By understanding that life is imperfect and that our desire for materialism leads to our suffering, then, as the Buddha states, terminating this desire would lead to the conclusion of one's suffering, frustration, and even faint unrest. Starting with its humble roots in India 2500 years ago, this message spread throughout East Asia, Western Europe, and, eventually, to the New World in the nineteenth century with the influx of Asian immigrants. In this process, Buddhism evolved, incorporating new devotional rituals and mystical qualities from the cultures it interacted with. Through interviewing various scholars and visiting important religious sites, both in the United States and in South Korea—a country whose Buddhist culture has been preserved by the government and is relatively unaffected by Communist, Christian, or political influence, as other Asian Buddhist countries are—I will examine the evolution of Buddhism in America and its evolution from its original roots. Through this project, this contemporary form will reveal an intricate dance between traditional beliefs and the influence of Western culture. This research is particularly important in the scholarship of religious studies in the United States. By investigating the factors that influence Buddhism in this country, we can learn about the dynamics of religion and American culture in general. The understanding of this relationship is crucial to recognizing and appreciating diversity and its effects on the American, as well as the global, community.

Indigenous Peoples and Migrants: New Nationalism in Ecuador

Liana Hervas

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In September 2008, a majority of Ecuadorians voted in favor of a new constitution that decisively places Ecuador among the left-leaning countries in Latin America. The content and popularity of Ecuador's latest constitution are the products of a strong, innovative nationalist project. Nationalism has historically been defined in terms of geographic borders and perceived cultural homogeneity. Ecuador's 2008 Constitution challenges more traditional definitions of nationalism by presenting highly inclusive ideas of citizenship. By including indigenous rights to autonomy and self-determination and constitutional rights for Ecuadorian migrants living abroad, the 2008 Constitution incorporates plurinational and transnational identities into its definition of the state. I analyze the 2008 Constitution, government and media documentation of the drafting process, the large body of historical and anthropological work on indigenous organizing in Ecuador, and documentation of second wave Ecuadorian migration to contextualize the kinds of citizenship offered by the 2008 Constitution. The Constitution's inclusion of plurinational and transnational citizenship broadens and emboldens traditional ideas of nationalism. The plurinational and transnational citizenship offered by Ecuador's 2008 Constitution inform a new kind of nationalism. Knowledge of this broadened version of nationalism provides a better understanding of Ecuadorian politics and the country's position in Latin America.

The Effects of Oxytocin on Food Sharing and Cooperation in the Capuchin Monkey (*Cebus apella*)

Carla Heyler

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Oxytocin (OT) is a neuropeptide that mediates social behaviors in humans, including trust, cooperation, and generosity. We here investigate

whether exogenous OT increases cooperative and food sharing behavior in a highly social non-human primate species, the capuchin monkey. This may improve our understanding of positive social behaviors and cooperative interactions in capuchins and help to clarify the evolutionary enigma of altruism through evidence of a mechanism by which OT facilitates cooperation. In our study, one or both subjects must pull bars linked to a tray in order to receive food (apples) on the tray. In the reciprocity condition, the tray is weighted so that both subjects must pull, though only one subject has access to the reward and must share it for his partner to receive any. In the mutualism control, both must pull and both receive a reward. In the solo control, only one subject need pull and only the same subject has access to the reward. We are testing whether OT administered intranasally will facilitate both the willingness to cooperate in obtaining rewards and the subsequent willingness to share the reward. OT administration is randomized so that in each scenario either one subject, both subjects, or neither subject receives OT (saline is the control). We will use a repeated-measures ANOVA to determine whether levels of cooperation and food sharing vary across conditions. Although data are still being collected, we predict that increased OT levels will correlate with an increase in both cooperation and subsequent sharing of the reward.

Analyzing the Function of *O*-GlcNAc in the *Drosophila* Nervous System

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A dynamic cycle of addition and removal of *O*-linked *N*-acetylglucosamine (*O*-GlcNAc) at serine and threonine residues is emerging as a key regulator of intracellular protein activity. Like phosphorylation, the *O*-GlcNAc modification significantly changes the function of the proteins to which it is attached. In addition, the *O*-GlcNAc modification may

compete with phosphorylation for certain Ser/Thr target sites. Although there has been considerable research on documenting the functional implications of phosphorylation, the functions for *O*-GlcNAc are just beginning to be understood. A significant amount of cancer and developmental biology research is focused on phosphorylation as a regulator of cell growth and differentiation, but relatively little attention has been paid to the involvement of *O*-GlcNAc in these processes. Like kinases and phosphatases, the enzymes of *O*-GlcNAc addition, *O*-GlcNAc transferase (OGT), and removal, *O*-GlcNAcase (OGA), are compartmentalized and regulated. We have capabilities to analyze the presence of *O*-GlcNAc on the intracellular protein. This project focuses on dissecting cell autonomous and non-autonomous functions of *O*-GlcNAc, by altering the expression of OGT and OGA within specific cells of the *Drosophila melanogaster* embryo in an effort to obtain a better understanding of the function of *O*-GlcNAc. Preliminary results have hinted that the addition of more *O*-GlcNAc in the engrailed cells of the *Drosophila* nervous system may hinder the engrailed cells' natural secretion of wingless cells. Further research on the function of *O*-GlcNAc, especially in the *Drosophila melanogaster* embryo, will continue to be conducted to obtain a deeper understanding of the glycan.

The Development and Implications of Predictive Modes of Thought from the Renaissance to Modernity

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This project shall focus on the development of predictive modes of thought, from the astrology of the Renaissance to modern probability theory. I will begin with a case study on the 16th century figure of Gerolamo Cardano. He holds special significance in this dialogue due to his early dealings with game theory, which gave rise to key precursors of modern concepts of probability. From there I shall move on to a brief overview of the correspondence between Fermat and Pascal, but with a larger emphasis on Ian

Hacking's concept of probability as an emergent concept rather than an epochal shift. The importance of this correspondence is that it made possible the idea of statistically predicting the future. The two scholars deal with the 'problem of the points,' that is, how to determine the most likely outcome of a chance game. With Hacking, I will focus on his work concerning the 'signs' of the low sciences that served to make predictions reliable, shifting from there to Pascal's wager and how that signaled the introduction of probability-based decision making. This leads into modern studies of economics, governmental policy, etc. This project will build upon other works of history of philosophy and mathematics by providing a more comprehensive focus on what exactly is probability and how it came to be. In a world so caught up in numbers, the significance of an encompassing study on the development of probability will serve to provide a basis of credibility for acting on predictions.

How AICD and Fe65 Are Recruited to Hirano Bodies

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Hirano bodies are actin-rich structures associated with a number of neurodegenerative diseases, including familial Alzheimer's disease. A possible link between Hirano bodies and familial Alzheimer's is human Amyloid Precursor Protein (APP). When APP is cleaved, the intracellular portion, called AICD, will normally bind to Fe65 and go to the nucleus to initiate apoptosis (programmed cell death). Yet, in the presence of Hirano bodies, it is sequestered in the Hirano body and cell death prevented. It will be determined whether Mena is the possible connection between the AICD and Hirano bodies because it binds to both Fe65 and actin. Mena is normally found in synapses and has been found to aid in memory. To determine if Mena and Hirano bodies are co-localized in the cell, Mena-GFP was co-expressed with rhodamine-stained Hirano bodies in HEK (Human Embryonic Kidney) cells. Mena concentrated into unexpected aggregations

that are rich in F-actin in the cytoplasm on one edge of the cell. Further experiments will show whether Hirano bodies are related to these novel structures or if increased Mena concentrations alone cause novel structures to form. Also, it will be determined if Mena is essential for the recruitment of AICD to the Hirano body by using Mena knock-out cells. The possible function of Mena in the AICD sequestering process or its role in the unexpected structures is very important in the search to explain the function of Hirano bodies as well as the possible implications for Alzheimer's disease.

The Effect of Titanium Dioxide Surface Area on Its Photocatalytic Activity

Whitney Ingram

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Titanium dioxide (TiO₂) is a highly effective photocatalyst under ultraviolet and near-visible irradiation. Photocatalysts such as TiO₂ accelerate photochemical reactions, and have been used to degrade organic substances. The catalysts are primary candidates as materials for hydrogen generation and the self-purification of water and air. The photocatalytic abilities of TiO₂ are limited by the quick recombination of the photogenerated electron-hole pair, slowing photodegradation activity. Previous research indicates tilted nanorods fabricated by an oblique angle deposition (OAD) technique produce a highly efficient photocatalyst; however, a systematic study of the relationship between photocatalytic activity and TiO₂ surface area has not been completed. The purpose of this experiment is to study and analyze the effect of the total surface area of the nanorod structure on the photocatalytic activity of TiO₂. Several nanorod arrays were fabricated by a custom-built electron-beam deposition system using the OAD method, with the nanorod height, and thus surface area, controlled by altering the thickness of the deposition. To quantify the photocatalytic behavior, TiO₂ substrates were placed in an aqueous solution of methylene blue (MB) and irradiated by UV light for regular time intervals. A UV-Vis spectrophotometer measured the absorption of the MB solution after each

irradiation interval, and the decay over time of the $\lambda = 664$ nm peak, which is characteristic of MB, was used to measure photocatalytic activity. Results have so far identified a direct relationship between the surface area of the nanorod substrates and their degradation rate.

From Hills to Plains: Cormac McCarthy's Use of Terrain, Landscape, and Environment

Wes Jackson

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Cormac McCarthy's novels focus on two specific regions in the United States. Along with his tenth novel, *The Road*, McCarthy's first four novels are set in Appalachian Tennessee, while the next five take place around the U.S.-Mexico border. Similar to William Bartram's and Willa Cather's use of landscape and setting, McCarthy's novels chronicle 100 years of characters' relationships to the landscape and should, therefore, be examined in the context of America's literary understanding of its environment. Further, I will gauge McCarthy's influence of narrating the landscape by comparing his Appalachian narratives to more recent works about the region, such as Charles Frazier's *Cold Mountain*. The Appalachian novels provide protagonists who encounter their environment on personal levels, and these relationships emphasize different psychological and theological dynamics of their contact with landscape. The landscape in the Southwestern novels, alternatively, emphasizes America's collective response to environment by echoing the lost cultures forced out by expansionism. While many can see in McCarthy's novels a strong conservationist theme, his work delves past ideas of preservation and reveals more fundamental elements of America's collective understanding of the physical world. Ultimately, McCarthy's novels show how we relate with landscape on psychological, spiritual, and metaphysical levels.

Drugs and Deterrence

Robert Jacques

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The deterrence of individuals is a justification for criminal laws and their penalties. Deterrence is based on the pleasure-pain principle and the severity, certainty, and swiftness of a punishment occurring after a crime has been committed. Jeremy Bentham identifies four types of sanctions in which the pleasure-pain principle operates: political, physical, moral, and religious. A body of work has emerged in recent decades that attempts to find a deterrent effect for crimes and the punishments associated with their violation. In terms of illegal drugs, these studies are limited to how criminalization affects marijuana use. This study attempts to study how people are deterred from using and selling different drugs in terms of the sanctions identified by Bentham. Surveys and interviews were conducted with more than twenty individuals with widely varying histories of drug use and drug dealing. At first, surveys were completed and, time permitting, interviews were conducted. After it was found that interviews provided much more useful data than surveys, interviews began to be exclusively used. Social relationships and moral sanctions were found to be the most important factors influencing a person's drug habit; the law and criminal justice system was rarely attributed to having much influence in deterring individuals, even among those currently part of the criminal justice system. Since a created deterrent effect is often used to justify drug criminalization, this research may provide new insights on drug policy and how people are deterred from using and/or selling drugs.

Early Voting in Georgia: A Compromise for Accessibility and Efficiency

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Now that nearly all adult American citizens are guaranteed the right to vote, too few actually exercise their duty to participate in the world's most prominent democracy. The U.S. ranks near the bottom of all industrialized democracies in voter participation. The state of Georgia is even worse, ranking the sixth worst state in total voter turnout. While all institutional barriers have

been dismantled, this policy proposal addresses how Georgia should encourage voter participation and eliminate inconveniences that act as a barrier to voter participation. While no panacea exists for declining participation, there are many progressive alternative voting methods that can eradicate inconvenience as an excuse for abstaining from voting. The Georgia General Assembly should pass legislation to make voting more convenient and accessible for all Georgians. To compromise opposing partisan arguments and possibly achieve improved voter turnout, Georgia should include Saturday to its successful early voting period while shortening its five week period to three weeks.

Additionally, this legislation should encourage absentee ballot usage by allowing voters to become permanent absentee voters. Extending Georgians' ability to vote through these measures, this legislation's two-prong extension may increase voter participation. Registered voters who have been less likely to vote in past elections will find that participating in democracy is more convenient, less time-consuming, and beneficial to themselves and their community.

Use of Click Chemistry to Assess Glycoprotein Dynamics in Cultured Cells

Steven Johnson

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Bioorthogonal chemical reporters are novel reagents in the field of chemical glycobiology that can be used for *in vivo* imaging of glycoproteins in cultured cells. Unlike large, bulky genetically encoded tags such as green fluorescent protein (GFP), these reporters are small molecules that can be incorporated into the cell's glycan biosynthetic machinery without harming the biological system. One such reporter, N-azidoacetylmannosamine (ManNAz), is a sugar analog that is capable of integrating into nascent glycoproteins as sialic acid residues. A chemical 'handle' can then be covalently linked to the azido group of incorporated ManNAz residues, allowing for the visualization of the modified glycoproteins using fluorescent probes that recognize this 'handle.'

Our goal is to use this technique (known as "click chemistry") to investigate the nature and dynamics of glycoprotein storage in lysosomal storage disorders such as mucopolisidosis II (ML-II), a congenital disease characterized by improper catabolism and accumulation of undigested macromolecules. Employing both epifluorescence and confocal microscopy, we have successfully visualized the accumulation of sialic acid-containing glycoproteins in the lysosomes of ML-II cells. Furthermore, the click chemistry has allowed us to view the dynamics of extracellular matrix (ECM) glycoprotein synthesis and turnover within WT cells. The application of different azide sugar precursors in other lysosomal storage disease tissues should provide us with additional ways to study the trafficking and turnover of glycoproteins in these cells. Our findings could facilitate new methods for lysosomal disease diagnosis and will provide unprecedented opportunities to track glycoprotein dynamics and turnover in affected cell types.

Characterization of an RNP Complex Involved in Invader Defense in *Pyrococcus furiosus*

Lindsay Jones – CURO Scholar, CURO Summer Fellow

Dr. Michael Terns and Dr. Rebecca Terns, Department of Biochemistry & Molecular Biology, University of Georgia

In eukaryotes, a system known as RNA interference (RNAi) provides defense against genome invaders such as viruses. Recent work indicates that an RNA-mediated system for viral defense also exists in most prokaryotes. Specifically, the prokaryotic CRISPR/Cas (Clustered Regularly Interspaced Short Palindromic Repeats/ CRISPR associated) system is a proposed analog of the eukaryotic RNAi system. CRISPR gene loci produce small RNAs known as prokaryotic silencing RNAs (psiRNAs), and Cas genes produce the proteins of this putative defense system. My research objectives were to characterize CRISPR locus transcription and to identify Cas proteins that interact with psiRNAs of *Pyrococcus furiosus*. Northern analysis suggests that CRISPR

transcription is unidirectional and produces large precursor RNAs. Furthermore, the data indicate that individual psiRNAs are generated by successive cleavages within repeat sequences adjacent to each psiRNA. To identify which of the numerous Cas proteins specifically interact with psiRNAs, we subcloned the genes of Cas proteins into *Escherichia coli* protein expression vectors. The Cas proteins were expressed, purified, and tested in RNA-protein binding (gel mobility shift) assays with RNA species representing either mature psiRNAs or processing intermediates. We identified a Cas protein that selectively and independently interacts with larger CRISPR RNA species but not smaller component RNA sequences. This RNA/protein interaction appears to recruit several additional Cas proteins to the RNA. The larger RNA-protein complexes that we have assembled may play an important role in the putative prokaryotic RNAi pathway.

Policy on the Crisis in Northern Uganda

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Northern Uganda has been plagued by over two decades of war perpetrated by the Lord's Resistance Army (LRA), a rebel army infamous for child soldiering. Although peace talks were held between the LRA and the Ugandan government between 2006 and 2008, it is now clear that Joseph Kony, the spiritual and military leader of the LRA, was never interested in negotiation. Last December, in response to a massive increase in the number of attacks made by the LRA, Uganda, the Democratic Republic of the Congo, and Sudan launched a military front against the LRA. While the fact that an alternative to peace through diplomacy was a progressive step, so far the mission has failed miserably and provoked Kony to retaliate with what have been called "The Christmas Massacres," a series of violent attacks killing over 400. If real progress is to be made toward peace, the international community must first recognize the severity of Kony's crimes. Though the International Criminal Court has indicted Kony and other top LRA leaders for crimes

against humanity, the amount of action or even rhetoric concerning the crisis is disproportionate. Second, a more strategic plan for Kony's apprehension and arrest must be developed. In this area, the US can contribute the most aid through logistical support and intelligence. Lastly, a comprehensive plan for reconstruction in the northern region of Uganda must be created to secure long-term peace and stability. In order to arrive at the best policy option for ending this twenty-year-long war, I analyzed the history of the LRA and the methods that have been attempted in the last twenty years under President Museveni's rule to defeat this rebel group. I used a timeline to organize qualitative and quantitative research concerning the relationship between various policy options and the overall "level of peace," which I used to measure the success or failure of the policy action. Lastly, I examined past government action as well as case studies concerning similar rebel groups that had been successfully defeated through government action.

How Has the Gospel of John Been Used to Denigrate the Jews?

Elizabeth Katz

Dr. Wayne Coppins, Department of Religion, University of Georgia

Since over half of the references to "the Jews" in the Gospel of John suggest a negative literary association, it is not surprising that the text has been used in Anti-Semitic rhetoric throughout the centuries. While scholars today verbally acknowledge that certain verses from the Fourth Gospel have been used to denigrate ethnic Jews, little work has been done to explore such discriminatory uses. In this presentation, instead of assuming the historical-critical focus on original meaning and context, I will assume the focus of reception history, which is on such historical interpretations and uses. This talk will examine the way the Gospel of John has been interpreted and used Anti-Semitically at influential points in its history such as in the Early Church documents, Luther's writings, and Nazi rhetoric. It seems these earlier interpreters read the term "the Jews" in its original context in John to apply to all ethnic Jews and then applied

this interpretation to contemporaneous Jews. This analysis will inform the way contemporary scholars engage the brutal history of the Fourth Gospel's use, as they seek to be faithful to the original situational text and mindful of the way the text has been exploited. Whether or not scholars agree with defamatory uses of the Gospel of John, the importance of understanding the particularities of such uses cannot be disregarded in this age of fundamentalism.

Fibrin Deposition in the Malaria-Infected Placenta: A Disruption in the Balance Between Coagulation and Fibrinolysis

Lauren Kelly – CURO Scholar

Dr. Julie Moore, Department of Infectious Diseases, University of Georgia

Placental malaria (PM) is characterized by accumulation of *Plasmodium falciparum*-infected red blood cells in the human placenta. This leads to maternal anemia and poor fetal outcome, including low birth weight and possibly perinatal death. Primigravidae are more susceptible to the devastating consequences of PM, suggesting the presence of gravidity-dependent immunological resistance among malaria-exposed women. Common features of PM include monocyte infiltration to the maternal blood space and excessive fibrin deposition, an end-product of blood coagulation. The immune factors involved in the recruitment and activation of maternal immune cells to the placenta and their role in local hypercoagulation are poorly understood. It is hypothesized that syncytiotrophoblasts, fetal cells facing the maternal blood circulation, secrete these cell mediators as well as pro-coagulants or anti-fibrinolytics, resulting in the influx of maternal immune cells and clotting/fibrin accumulation. To address this hypothesis, placental plasma samples were collected in malaria-endemic western Kenya and stratified according to PM status and gravidity. The results reveal higher levels of soluble immune factor expression in PM+ primigravidae compared to multigravidae. The levels of plasminogen activator inhibitor-1 (PAI-1), which inhibits fibrin degradation, and Tissue Factor Pathway Inhibitor (TFPI), which

suppresses clotting, are being evaluated by ELISA. Finally, semi-quantitative estimation of fibrin and PAI-1 protein by western blot is also being performed. Elucidation of which soluble immune and coagulation factors are expressed during PM will contribute to understanding the immunological mechanisms occurring at the materno-fetal interface of the malaria-infected placenta.

String Theory and Its Mathematics

Tyler Kelly – CURO Summer Fellow

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When working in String theory, Kaluza-Klein theory demonstrates six extra dimensions in addition to our typical 3 spatial and one time dimension are necessary. In relation to our current scope of the real world, what do these six extra dimensions look like? The criteria given for these extra dimensions constitute a Calabi-Yau shape, a geometric object that has had its own history throughout the history of mathematics. We will explore these questions, the Calabi-Yau space's time in the limelight, its properties and algebro-geometric characteristics.

Mandatory Health Insurance: A Necessary Change

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According to the latest reports by the U. S. Census Bureau, 45.7 million individuals in the United States are uninsured. Despite current government programs, 31.6 percent of persons below the poverty level lack insurance, and 24.5 percent of households with an annual income less than \$25,000 have no health insurance. A large uninsured population creates numerous problems, including higher premature mortality rates for the uninsured, higher health insurance premiums for the insured, and financial and logistical pressure placed on the healthcare industry. After researching domestic and foreign health care policies, current problems, and purposed solutions, it has become clear that a new approach must be taken. The United States

must implement a policy requiring all residents of the United States to purchase health insurance operating on a bracketed system established for addressing the needs of the poor and under resourced. Universal mandatory health insurance will be costly, but the long-term benefits of this policy will far outweigh the initial costs. The socioeconomic benefits include the potential to lower health insurance premiums, improve the quality of care received by the previously uninsured, increase the health and longevity of the populous, and even increase economic productivity.

Chicken Pedigree Flocks are the Ultimate Source of *Salmonella* Contaminating Poultry Meat

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Salmonella is one of the leading contaminants found in the poultry products, which causes illnesses in many consumers of meat and eggs throughout the world. In the poultry industry, *Salmonella* is challenging to eradicate and control due to its ability to be transmitted horizontally, which is direct or indirect contact with pathogenic environment, or vertically, which is the spread of *Salmonella* from parent breeder birds to the next generation of birds. We believe that chicken pedigree flocks are the ultimate source of *Salmonella* contaminating poultry products. *Salmonella* was isolated from primary breeder, broiler breeder chicken farms (reproductively active birds), and broiler chicken farms (meat birds). One of the methods used to test this hypothesis was running pulse field gel electrophoresis (PFGE) to relate *Salmonella* isolates from chicken carcass to the primary breeder farms. CDC uses PFGE as the standard protocol to recognize outbreaks by matching DNA fingerprints. Upon running PFGE, it was observed that *Salmonella* strains from chicken carcasses, broiler farms, or broiler breeder farms matched strains from primary breeder. Vertical transmission of specific *Salmonella serovar* (Enteritidis, Heidelberg, and Kentucky) was

observed between the primary breeder farm and chicken carcasses, and broiler breeder farms. On the other hand, we also observed some *Salmonella* strains that did not match to the primary breeder level. It is important to control *Salmonella* through vaccination at the primary breeder level and broiler breeder level to prevent chicken carcasses contamination from *Salmonella*.

Imaging of Seizure-Induced Ca²⁺ Waves in Developing Zebrafish

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Over 50 million people suffer from epilepsy worldwide. Seizures in two thirds of all patients have no known cause, and seizure is the second leading cause of disability and death of children under the age of fourteen. Current evidence indicates that seizures in children differ from those in adults. Larval zebrafish are a good model organism to study seizures *in vivo* due to 1) their transparent body, 2) their fast growth during embryonic development, 3) the availability of chemicals known to artificially provoke seizure, and 4) their genetic proximity to humans as vertebrates. In this study, I tested the hypothesis that the pattern of seizure activity changes in zebrafish as a function of brain development. Zebrafish transgenic for a genetically encoded calcium (Ca²⁺) indicator, known as *cameleon*, were utilized to measure Ca²⁺ concentration changes in neurons. Changes in Ca²⁺ concentration can be used as an indicator of neural activity because synaptic events are triggered by calcium inflow into the neurons. A statistical technique called the Statistical Optimization for the Analysis of Ratiometric Signals (SOARS) developed by our laboratory was used to detect and analyze seizure-induced Ca²⁺ waves in the central nervous system (CNS). Seizure was provoked by pentylentetrazol (PTZ), and zebrafish at one to eight days post-fertilization were imaged using confocal microscopy. Analysis of my imaging data revealed that 1) the magnitude of Ca²⁺ waves

increased as the brain became more complex, and 2) the duration and frequency of waves changed as the brain matured.

Exercise and Cognition in Overweight Children

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Evidence has suggested that exercise can have a variety of beneficial effects on cognition. This study investigates whether exercise benefits children's executive control (EC). EC constitutes supervisory control of cognitive functions, including inhibition and allocation of attention and memory. The participants were 25 sedentary, overweight (BMI \geq 85th percentile) children ages 8-11 years old. Subjects were randomly placed into either an attention control group, which engaged in instructor-led sedentary activities, or an exercise intervention group, which participated in aerobic training for 40 minutes/day, 5 days/week for 9 months. An antisaccade task and Eriksen flanker task were used as behavioral measures of EC and were tested at the beginning of the intervention and at 9 weeks. Antisaccade tasks involve the suppression of a prepotent visual response and generation of eye movement towards the mirror-image unmarked location. The flanker task requires suppression of interfering responses and selective attention to a central target. Because antisaccade and flanker tasks are relatively well-understood measurements of EC, observing changes in antisaccade and flanker performance over time for both groups could provide evidence for an effect of exercise on cognition. It is hypothesized that the exercise group will demonstrate increased performance on both antisaccade and flanker tasks as compared to the control group. By providing evidence for the positive effects of exercise on cognition, this study would support the implementation of aerobic exercise programs in schools so that children in America would be healthier, both physically and mentally.

Cap and Trade: A Comprehensive Solution to Georgia's Water Problem

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The state of Georgia suffers from extremely low stream flows, precipitation, and soil moisture, otherwise defined as severe drought. These water shortages create tremendous economic, environmental, and social costs for Georgia. Such climatic patterns are not new; however, increasing demand from rapid population growth will soon exacerbate the consequences of the water crisis. Yet, the state historically intervenes only in times of severe drought and water shortages. These regulatory practices are reactive in nature and fail to offer long-term solutions to the problem. To resolve this dilemma, the Georgia Assembly should enact legislation establishing a cap-and-trade program for water distribution. This system would reduce demand by allocating limited amounts of water to individuals or corporations based on the value of its use. The state government would allocate water credits to pre-established water utilities for distribution. Individuals or corporations may then buy or sell units of water based on need and perceived value of each unit. A market-based approach remedies traditional complications seen in past attempts at regulatory allocations. Using previously established water management districts, water consumption credits would be allocated based on current population assessments as well as previous water consumption. Creating a market through which credits could be bought and sold would insure that credits would be redistributed to their highest valued use. Georgia has yet to implement such a reform, as any water restriction may result in movement of valuable companies towards neighboring states. Two case studies of cap-and-trade mechanisms were also used. As seen in other market reforms, cap-and-trade will alleviate the impacts of current and future water shortages while ensuring that resources are efficiently allocated. Water-move, an Australian based initiative, has been used to create a water market. This has been effective in drought mitigation. In addition, lessons can be

learned from U.S. SO₂ cap-and-trade practices, which have significantly reduced harmful emissions.

Detuning London: Street Musicians and the Noise Suppression Campaign in Victorian London

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A combination of street musicians, balladeers, hawkers and industrial workshops sometimes made life in Victorian London unbearable. Many notable artists and writers expressed their distaste for the noises of the streets in their diaries, books, and art; claiming that it impeded their work and endangered the health of those whose illnesses were treated at home. Others defended street musicians and the like as a cheap and delightful source of entertainment and work for the poor. Many historians have chosen to reflect on this subject with its climax being the 1864 passing of the Metropolitan Police Act. However, the post-1864 debate reveals a larger class conflict and a convergence of authority directed at shaping lower class behavior and order. An analysis of the post-1864 life of the street musician offers a great deal of insight into changing social relations and power structures in the late Victorian era as well as insight into Victorian perceptions of ownership, privacy, immigration, and taste.

Manicures: Not Just Paying for Pretty Nails

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Dress is a major form of nonverbal communication. It is defined as any modification or supplementation to the body (Eicher, Evenson & Lutz, 2008). Manicuring falls under both of these categories: the trimming and shaping of nails is a modification of the body; the addition of color and false fingernails is a supplementation to the body. American women from all social classes pamper themselves by purchasing manicures. While for some women

manicures are a weekly routine, for others manicures are a rare indulgence. A woman's nails convey a lot of information. For example, they can suggest her social standing and indicate the type of work she does on a daily basis. The purpose of this paper is to explore the seemingly "mundane," gendered practice of manicures in a scholarly fashion and investigate the emotional and therapeutic benefits women get from it. I provide background information about the practice of manicures and discuss the central role of the manicurist in the process. Many manicurists consider themselves emotional laborers because they are not only supposed to beautify the hands and nails of their clients, but are expected to provide emotional relief to their customers as well. I also investigate why and how manicures are being used as a form of health treatment for the elderly and women with Alzheimer's disease and dementia. Many elderly women consider manicures their only form of beauty therapy. An additional bonus is that, during a manicure, elderly women are touched by the bare hands of the beauty therapist. This is very important because caring human touch is often missing from elderly women's lives. Manicures are part of the hospital treatment of patients of Alzheimer's disease and dementia because this repetitive activity provides them not only with a soothing physical sensation but emotional benefits as well.

Transcription Regulation by the Bacteriophage T4 AsiA Protein: AsiA Interactions with the Beta Subunit of RNA Polymerase

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The AsiA protein is a product of the T4 bacteriophage *asiA* gene. AsiA inhibits transcription at early phage promoters and host promoters by binding to the sigma-70 subunit of the host (*Escherichia coli*) RNA polymerase. AsiA alters the special relationship between the sigma-70 subunit and the β -flap, which results in the inability of the polymerase to properly recognize these promoters. Thus, transcription is inhibited. Because the *asiA* gene is, itself, an

early gene, a feedback loop results that prevents the overaccumulation of the AsiA protein. This is important because AsiA is toxic to the host cell. This antibiotic/antimicrobial potential could, therefore be exploited to assist in developing a novel class of antibiotics that mimic, mechanistically, AsiA function. We have localized the β -flap binding site on AsiA to regions near the C-terminal portion of the AsiA molecule using nuclear magnetic resonance (NMR) spectroscopy. Furthermore, we have determined the affinity of AsiA for the β -flap region using surface plasmon resonance (SPR). To define the contributions to affinity of each of the amino acids in the binding region, alanine scanning site-directed mutagenesis was employed. Each of the amino acids in the putative β -flap binding region was mutated to alanine to assess the contribution of that amino acid side chain to affinity for the β -flap. The structural integrities of the mutants were confirmed using NMR. The studies to measure the affinities of these mutants for the β -flap are ongoing. Overall, our results will be integral to a comprehensive, general understanding of transcription regulation.

Biopsychosocial Factors and Healthcare Utilization in Children With Non-Cardiac Chest Pain

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Chest pain is a frequent reason for referral to pediatric cardiologists. However, 95% of these children experience pain that is non-cardiac in origin. In the vast majority of these instances, the cause of the pain is idiopathic. Currently, the little research that has been done in this area suggests that psychosocial factors may play a prominent role in the etiology, severity, and maintenance of this condition. The purpose of this ongoing study is to delineate factors particular to children and adolescents who present in a cardiac specialty clinic with non-cardiac chest pain (NCCP) versus those who present with innocent murmurs (IM). Participants include individuals 8 to 18 years old who were referred to a pediatric cardiology

clinic for a first time evaluation of symptoms of chest pain or heart murmur. Only patients with a diagnosis of NCCP or IM were retained in the study. Data were collected in three cardiology clinics as part of the patient's medical work-up. Measures of pain, somatic symptoms, psychological symptoms, and healthcare utilization were administered to the children and their parents. Preliminary results indicate that children with NCCP experience significantly more somatic symptoms, anxiety, and depression than children with IM. They also experience greater functional disability due to their symptoms. Children with NCCP also had significantly higher rates of healthcare utilization in the past year than those with IM. Applications for this research include clarifying the contribution of these psychosocial factors to inform efficacious treatment, decrease familial distress, and decrease health care utilization.

Georgia's Forest Biomass and the 2007 Energy Bill: What's Wrong and How to Fix It

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The Energy Independence and Security Act of 2007 (EISA) reduces Georgia's ability to economically manufacture renewable liquid fuel from forest biomass. Georgia ranks among the top of all states in its possession of obtainable forest biomass, but the Act's definition of "renewable biomass" excludes the majority of Georgia forestland from being used to manufacture transportation fuel. The purpose of this research is to suggest and support a definition that would better enable Georgia to establish a viable renewable fuels industry. This definition should be a broader, more scientific definition which includes any organic material available on a renewable, recurring basis. This definition would likely incorporate appropriate federal lands and all private forestland in compliance with current Georgia's Best Management Practices for timber harvest. Naturally regenerated hardwoods and plantation-grown pines would likely be included regardless of when they were last harvested. With this

broad renewable biomass definition, nearly 24 million forested acres of Georgia's 34 million acre total land base would qualify for use in the production of transportation fuel under EISA. Research is based on literature including congressional testimony, trade association position statements, personal interviews, and newspaper articles. Forest inventory reports and scientific journals are included when appropriate. The research intends to show that current law will not have the long-term effect of increasing the size of Georgia's forest cover, jeopardizes the establishment of a renewable fuels industry in the state, and, finally, that its language is based on a precautionary, yet misguided, philosophy of environmental protection.

The Importance of Specific Genes within the Cobalamin Region of Mycobacterium Tuberculosis and Their Effect on Virulence

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Tuberculosis (TB) is an infectious disease caused by the bacillus *Mycobacterium tuberculosis*. In 2005, 9.2 million people were diagnosed with the disease and 1.7 million deaths were recorded. The World Health Organization estimates that one-third of the world's population is infected with TB, and 10% of those infected have the risk of developing the active form. In order to successfully prevent, diagnose, and treat this disease, it is imperative to understand the mechanisms this pathogen uses to survive in a human host. Cobalamins, such as vitamin B12, are cofactors in many reactions including DNA synthesis, protein synthesis, and fat and carbohydrate metabolism. *M. tuberculosis* contains a cluster of genes that are thought to be responsible for production of cobalamin. It is hypothesized that this cobalamin synthesis region is advantageous towards the survival of this pathogen in the human host. This biosynthetic region contains additional genes that are known to contribute to virulence. To determine if cobalamin is involved in virulence, a mutant of *M. tuberculosis* strain Erdman lacking the cobalamin cluster has been

constructed. To clarify which genes are required for cobalamin synthesis, several plasmids carrying different parts of the deleted region will be cloned and transformed into the mutant. Progress towards the construction of these plasmids containing the specific cobalamin regions will be presented. If specific genes can be discovered to affect virulence and pathogen survival, then it is possible to better diagnose and treat tuberculosis.

Poetic Pedagogy: Teaching Creative Writing at Coile Middle School

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According to Cahnmann (2006, 2008), seldom do teachers find opportunities within the mainstream classroom to listen deeply and attentively to the music in students' vernacular uses of language or the creativity and content in their spoken and written words. This research chronicles my experiences as a novice creative writing educator working with eight low-income, dialect speakers of English in the context of an after school middle grades program in Georgia. Following Cahnmann's (2006, 2008) use of poetry and Hankins (2003) use of narrative as data in teacher research, a narrative and poetic journal has been constructed, filled with field notes, or what Hankins describes as "heartnotes," which are reflections that document experience, acknowledge personal biases and critically and poetically reflect on those biases. Analysis draws both on students' engagement in the creative writing process as well as the effect narrative and poetry have on my own experiences as a first time creative writing instructor. The narrative and poetical journal documents patterns in students' writing and in my own journaling, specifically, areas of greatest strength, weakness, and noteworthy misunderstandings. Analysis of these patterns will ultimately answer the question of what needs greater instructional emphasis: more traditional literary analysis, poetic and creative writing mechanics or instructor-student empathy

and understanding. Findings discuss "the craft, practice and possibility" (Cahnmann, 2003) of maintaining a creative stance toward English language instruction. A hybrid presentation including poetry and prose will be used to communicate intellectual and emotional conclusions drawn from this teacher-research experience.

Comparative Studies on IDE-Activating Compounds

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The insulin-degrading enzyme (IDE) is associated with the clearance of the A β -peptide, which is believed to be the neurotoxic agent in Alzheimer's disease. IDE is part of the M16A subfamily along with the yeast enzyme Ste23p that is highly similar in amino acid sequence, having approximately 40% identity. Because of these and other similarities, we hypothesize Ste23p and IDE to have similar enzymatic profiles. To test the hypothesis, the enzymatic activities of the two enzymes and several other proteases were compared and contrasted using a fluorescence-based assay and a panel of eleven IDE activators previously identified by the Schmidt lab. The assay makes use of a synthetic dodecapeptide substrate that is readily cleaved by M16A proteases. This comparison is important for understanding the mechanism of activator action and the specificity toward M16A enzymes, which will impact the development of potential therapeutic strategies for Alzheimer's disease. While some compounds activated both Ste23p and rat IDE, as originally hypothesized, others affected Ste23p and IDE differently. Compounds 4, 8, 9, and 10 were most specific for the M16A proteases, having a limited effect on bovine trypsin and the yeast proteases Rce1p and Ste24p, all of which are unrelated to M16A proteases. Future investigations of the effect of compounds on the activity of human IDE, especially in the context of A β as substrate, are now being planned. Since insulin is another substrate of IDE, we also plan to determine the

impact of these compounds on modulating insulin degradation. It is our long-term aim to use our specificity data in the development of new compounds that specifically enhance IDE-mediated A β degradation over that of insulin so as to minimize non-specific effects associated with an IDE activator-based therapeutic strategy for Alzheimer's disease.

Investigation of the Genetic Basis of Longevity in *Caenorhabditis elegans* Using Microarray Analysis

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Mutations in genes along the insulin-like signaling pathway in *Caenorhabditis elegans* cause the largest lifespan modulations recorded in science. We seek to explain the mechanism behind this phenomenon by documenting gene expression in animals with these mutations via microarray analysis. A population of *C. elegans* with a hypomorph *daf-2* gene displays both increased median and maximal lifespan. The *daf-2* protein is analogous to the insulin receptor and operates at the beginning of the cascade. The *daf-16* gene functions as a downstream suppressor of both categories of lifespan phenotype. O-GlcNAc is a common regulatory post-translational modification to proteins along this pathway, and hypomorphs of the O-GlcNAc cycling enzymes also impact lifespan. The *ogt-1* mutation (coding for O-GlcNAc transferase) brings only median lifespan back to wild type, thereby closing the phenotypic gap between the *daf-2* mutant and the *daf-2*; *daf-16* double mutant. In this study, RNA extracted from nine-day-old populations of several *C. elegans* strains will be sent off for microarray analysis. This will provide information on how the genes known to influence lifespan are impacting regulation of other nearby genes. In the data, we will be looking for genes which are brought back to wild type expression levels in *daf-2*; *daf-16* mutants but not in *daf-2*; *ogt-1* mutants. Such genes will be prime candidates for the genetic basis of maximal longevity, and understanding their biochemical functions will help indicate the mechanism by which insulin signaling is

modulating lifespan. This study carries implications for any species with the insulin signaling pathway

Perceptions About the Implementation of the Georgia Performance Standards in Mathematics

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In 2008, the Georgia Department of Education decided to change its high school curriculum from the Quality Core Curriculum to the Georgia Performance Standards (GPS). The Georgia Mathematics Performance Standards combines the previous subjects of Algebra, Geometry, Statistics, Trigonometry, and Pre-Calculus into an intensive four year study sampling from at least three of these subject areas every year. This project was developed to evaluate the views of teachers, parents, and students during the first few years of the Georgia Performance Standard's implementation. The opinions of the teachers, parents, and students have a direct relationship with the success and longevity of the Georgia Mathematics Performance Standards. A series of surveys and interviews will provide an outlet for the stakeholders to express their opinions and a viable way for the perspectives on the implementation of the Georgia Mathematics Performance Standards to be carefully interpreted. This study will help teachers and school district officials to understand what participants think about new curricular innovations and help to improve its implementation.

The Relationship Between Parental Disciplinary Practices and Children's Social and Emotional Competence in Low-Income Families

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Parents are influential in providing an environment for their children to develop social

and emotional competence starting from an early age. Specifically, how parents regulate children's misbehaviors through disciplinary actions may contribute to children modeling parents' behaviors in interacting with others. At-risk children are distinct in their interpretation and regulation of emotions with characteristics such as withdrawal or externalizing behaviors. Examining the influence of parental disciplinary strategies and the attributions of wrongdoings on at-risk children's outcome behaviors poses important implications for interventions. The study consists of two waves of data collected over 3 years in documenting children's social and emotional development from multiple assessments. Forty-three children, with ages ranging from 37 months to 43 months, from a community Headstart program participated in the study. These children were nominated by their teachers based on various types of social and/or emotional issues displayed in the classrooms. Parents completed a parental survey describing the frequency of various positive and negative behaviors observed at home, along with attributions of these behaviors and the disciplinary strategies used. The results of our study reveal that when a parent chooses disciplinary strategies such as Time Out or Ignoring, and chose not to properly explain the reason for punishment, the child may comply with the punishment but not understand which behavior caused them to be disciplined. The child may internalize these forms of discipline as unreasonable or neglect, resulting in social and/or emotional issues expressed through negative behavior that occur in the classrooms, qualifying them for the study.

Altered Surfaces: Fabric Manipulation and Design

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The main focus of my research is fabric manipulation: folding, layering, and stitching of flat fabric to create surfaces with volume, texture, and dimension. I construct fabrics that are made up of small components of manipulated fabric, which combine to form a whole, just as the petals of a flower combine to create something that is more graceful and beautiful than simply the petals themselves. I enjoy working with small components because they allow me to gradually build up a fabric's surface over time, exposing my evolving thought process as I go along. There is a natural sense of movement and energy to these pieces. I find myself balancing a playful aesthetic with rich, sumptuous colors and textures. To further expose the transformative nature of my work, I reinterpret the textural surfaces in a two-dimensional format through drawing and screen-printing. The process is endless, and the excitement lies in that I never quite know what the outcome will be.

Glycan Interactions and the Development and Spread of Cancer Cells

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Signaling through the Notch receptor protein modulates cellular differentiation during normal development and maintenance of stem cell populations. Disruptions in these interactions contribute to the initiation and spread of cancer. For Notch to function correctly, it must be modified with O-linked glycans that begin with a fucose residue. Extension of the Fuc with an N-acetylglucosamine is accomplished by an enzyme called Fringe. In vertebrate tissues, the GlcNAc-Fuc disaccharide is extended with galactose and sialic acid. In *Drosophila*, it has been unknown what happens to the GlcNAc-Fuc disaccharide until recently. We have identified an extension of the GlcNAc-Fuc disaccharide with glucuronic acid. The novel glucuronylated trisaccharide is the dominant O-Fuc glycan in the *Drosophila* embryo. To determine whether this glycan structure participates in Notch signaling, O-linked glycans were isolated from embryos mutant for the Fringe enzyme. Interestingly, the O-Fuc trisaccharide was reduced, but not eliminated by this mutation, indicating that previously unknown Fringe-like activities are present during embryogenesis. This new complexity in Notch signaling may relate to human cancer progression. We are applying our techniques to characterize the diversity of N- and O-linked glycans expressed in pancreatic cancer sample. If indicators of abnormal cell-cell signaling are found, they may serve as early markers for pancreatic cancer. Our pilot studies are focused on fluid harvested from the pancreatic duct of patients with pancreatitis and presumptive pancreatic cancer. Initial efforts indicate the need to determine which markers report pancreatic cell function and not confounding contamination by blood proteins.

**A Physical and Enzymological
Characterization of Human Neuron Specific
Enolase**

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Enolase catalyzes the ninth reaction of glycolysis, the dehydration of 2-phospho-D-glycerate (2-PGA) to phosphoenolpyruvate (PEP). The reverse reaction, a hydration of PEP to 2-PGA, occurs in gluconeogenesis. Magnesium is required for activity. Enolases are generally abundantly expressed, so are major cellular proteins. In addition, three isozymes of enolase exist in vertebrates. Enolase α is ubiquitous through all cells. Enolase β is muscle-specific. Enolase γ (the one with which we are working) is neuron-specific and is referred to as neuron-specific enolase (NSE). Each enolase is a homodimer. The goal of the research is to determine whether or not the subunits operate independently. The human NSE gene supplied, with a C-terminal His-tag attached to facilitate purification, was expressed in *Escherichia coli*. The enzyme has been characterized physically and enzymologically. Two articles describe the enzymological characteristics of human NSE but present no data. This preparation for human NSE is shown to be homogeneous, as expected from previous experiments. The dependences of activity on magnesium, substrate, and potassium chloride concentrations as well as pH were determined. Stopped-flow measurements of the reaction of human NSE with a slowly reacting chromophoric substrate analogue were done. In tris buffer, the reaction exhibits biphasic kinetics. In PIPES, the magnesium-dependence shows two activation constants. These observations are consistent with catalytically significant interactions between the two active sites. Many cellular proteins exist as oligomers and transmission of information (communication) is crucial to the maintenance of life. Study of a simple system of interprotein communication increases understanding of this fundamental process.

**The Absence of Term Limits in the
Constitution: Motivations of the Framers**

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Following the Revolutionary War, the Framers of the American Constitution sought to establish a new government free from the tyranny of monarchy. Arguably, however, their new system enabled the creation of a new aristocracy through perpetual reelection. This paper examines why the Framers, with their great fear of entrenched power, did not include term limits in the Constitution. In studying contemporary American government charters, it appears clear that this decision went against the common practice of the time. Since the absence of controls on reelection was a radical departure from the norm, this paper examines pamphlets from the early American period to highlight the powerful defenses of term limits. Using notes from the Constitutional Convention as well as personal correspondence, it appears that the Framers themselves were divided on the issue. The ultimate decision to exclude term limits was the result of several arguments, including the belief that the possibility of reelection would encourage good service, the view that voters should have the right to elect whomever they please, and the expectation that other institutional safeguards would prevent the development of tyranny. Indeed, the existence of such a multiplicity of rationales is one of the most important results of this study. With the intent of the Framers functioning as common evidence in modern Constitutional jurisprudence, it is critical to gain a clear understanding of their opinions. This paper suggests that elements of the Constitution were not always the result of unanimity of opinion, making the "Framers' intent" difficult to discern.

Improving the Activity of the Heterologously Expressed Soluble Hydrogenase I from *Pyrococcus furiosus* through the Modification of the BW25113 (*E. coli* K12) Genome.

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Hydrogen is the cleanest, most promising fuel alternative for the future. Hydrogen has approximately three times the stored energy per unit mass as gasoline and can be biologically produced in a carbon neutral reaction, releasing only water as a byproduct. However, the renewable synthesis of hydrogen is currently under-developed and inefficient. *Pyrococcus furiosus*, a hyperthermophilic archaeon, produces a soluble four-subunit hydrogenase enzyme, called soluble hydrogenase I, that metabolizes hydrogen reversibly *in vitro*. To engineer modified forms of this enzyme with tailored catalytic activity and electron donor specificity, we needed to express an active recombinant hydrogenase in a model organism such as *E. coli*. We transformed four plasmids, containing the 13 necessary structural and processing genes, into *E. coli* to enable the expression of recombinant soluble hydrogenase I from *P. furiosus* (USA patent 61/005,383). We are now trying to enhance this specific activity of our recombinant hydrogenase. It is possible that *E. coli*'s native hydrogenase enzymes interfere with the functionality of our recombinant hydrogenase. We hope that by removing the genes associated with native *E. coli* hydrogenases, we will have a clearer background in which to express our recombinant hydrogenase. The future commercial production of hydrogen depends upon our ability to synthesize recombinant hydrogenase more efficiently. Thus, we hope that we can preserve the environment and create a more fuel-efficient society by improving our recombinant enzyme and making hydrogen a realistic fuel alternative.

Food for Thought: A Comprehensive Overhaul of American Food Aid Policy

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In 2008, global food prices nearly doubled from the year before. Already, hunger kills more people annually than AIDS, malaria, and tuberculosis combined. Despite U.S. efforts aimed at resolving global food insecurity, the inefficiencies of the United States' food aid programs actually compound the problem. Currently, U.S. food aid constitutes nearly two thirds of worldwide food donations, yet roughly 60 percent of food aid appropriations are misspent on domestic subsidies. From a qualitative analysis of historical and economic data provided by United States Department of Agriculture and United States Agency for International Development budgets, the United Nations World Food Programme, and various non-governmental organizations, this study proposes three U.S. food aid reforms: (1) that food aid programs be streamlined and moved under the jurisdiction of an Office of Food Security, whose mandate emphasizes the agricultural development of the recipient country; (2) that those aspects of food aid programs solely benefiting influential U.S. constituencies be eliminated or reduced; and (3) that a food security database be created and made accessible to food aid recipients and stakeholders, allowing for a more cohesive, country-specific approach to hunger. This study contends these improvements will benefit the U.S. by lowering U.S. taxpayers' long and short-term American aid costs, and by increasing global security through the enhancement of recipient governments' legitimacy.

Thermal Adaptation and Substrate Limitation of Heterotrophic Soil Microorganisms

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Heterotrophic microorganisms decompose stores of soil organic carbon and, as a consequence,

release carbon dioxide to the atmosphere. Although, in the short-term, microbial respiration rates increase in response to increasing temperatures, the effect of long-term temperature increases on respiration rates remains uncertain. Due to mechanisms such as evolutionary trade-offs in enzyme function and shifting community structure, it is expected that mass specific respiration (R_{mass}) rates will decrease as soil microbe communities adapt to higher temperature regimes. In order to test this potential, we used a laboratory microcosm approach to impose two thermal regimes (constant 12°C or 28°C) on twelve soil samples for 84 days. Additional carbon in the form of glucose was added weekly to one replicate of each soil to account for the possibility of substrate limitation masking the difference in R_{mass} between the two incubation temperatures. To determine the R_{mass} of the soil microbes, we measured the amount of carbon dioxide produced by each soil sample, using assay methods similar to those used in animal, plant, and microbial thermal adaptation studies. Data are being analyzed to test the hypothesis that at intermediate temperatures R_{mass} will be greatest for the 12°C experimentally incubated soils, and lowest for the 28°C soils, indicating thermal adaptation of microbial respiration. Because the soil ecology community currently dismisses this thermal adaptation relationship, conventional thinking will be challenged if results are consistent with the hypothesis. Additionally, this research is necessary to not only more fully understand microbial respiration responses to changing temperatures but also to more accurately predict possible feedbacks between microbial respiration and climate change.

Determining Genes Required for Virulence in the Opportunistic Intracellular Pathogen *Rhodococcus equi*

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The facultative intracellular bacterium *Rhodococcus equi* (*R. equi*) causes severe, pyogranulomatous pneumonia in neonatal foals, and is a life-threatening pathogen of

immunocompromised humans. Virulence of *R. equi* depends on the presence of an ~81Kb plasmid, harboring a ~27.5Kb pathogenicity island (PI) containing several ORFs, including those of a novel family of surface-localized and secreted proteins of unknown function termed the virulence associated proteins (VapACDEFGHI). VapA is essential for bacterial growth in *in vitro* grown macrophages and for bacterial survival in a SCID mouse *R. equi in vivo* infection model. However, VapA alone is not sufficient for virulence, as expression of vapA in a plasmid-cured strain does not restore the virulence phenotype. Determining the identity and location of additional plasmid-encoded virulence genes is the focus of the present study. Our recent data have revealed that these other virulence determinants lie within the PI. For complementation analysis, we have used an avirulent plasmid-cured strain of *R. equi* as a vehicle to express vapA along with various combinations of PI genes. Examination of the intracellular growth phenotypes of the latter recombinants, seen through macrophage infection experiments using the complemented strains, has implicated a potential virulence role for 3 genes, orfs 5, 6, and 7 respectively. In addition, construction and virulence analysis of various unmarked gene deletion strains is underway. The deletion of the potential virulence factors will utilize homologous recombination, employing a single-crossover intermediate step followed by fluorocytosine counter-selection. The combination of complementation and deletion studies will determine the complete set of PI virulence factors.

Ambient Gender Cue Vigilance in Choosing College Majors

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Recent research shows that the broadcasting of masculine stereotypes may underlie the lack of women's participation in the field of computer science. This process has not been tested,

however, in real world learning environments, a limitation addressed in the current study.

Whereas previous research used worded descriptions of fictitious settings, the present research examined reactions to real educational environments, via pictures of campus buildings, classrooms, hallways, common areas, and offices. The goal of the study was to gauge reactions to physical environments housing traditionally male-dominated (Computer Science), female-dominated (Education), and more gender-neutral (Business, Journalism) majors. Twenty-nine female and twenty-three male University of Georgia first year students with undeclared majors participated in the study. They first rated their interest in ten distinct career paths. They then viewed unlabeled pictures taken in buildings housing the four majors. Following each set of pictures, participants answered questions concerning their perceptions of social fit with the environment, the desirability of the environment, the masculinity/femininity of the environment, and likelihood of spending their college years in the environment. Results did not affirm the hypothesized gender difference in reactions to the four environments. The results did reveal, however, significant correlations of perceptions of masculinity/femininity with the other ratings for each of the four disciplines for women but not for men. This suggests that women's perception of gender cues communicated by a physical environment may play a significant role in women's motivation to join that environment. Theoretical and practical implications are discussed.

Analysis of Phospholipids in Neuronal Tissue Using Electrospray Ionization-Mass Spectrometry

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Phospholipids are an important constituent of all cell membranes, and are thought to play key roles in several physiological processes. This research focuses on the use of electrospray ionization-mass spectrometry (ESI-MS) in

studying alterations in the phospholipid profiles of neuronal cells in response to different kinds of stress. First, the effects of cocaine withdrawal on the expression of glycerophospholipids in rat brain were studied. For the first time, differences in the expression of phospholipids between different areas of the rat brain were determined by ESI-MS. Withdrawal from cocaine appeared to effect expression of specific phospholipids in a site specific manner, with most of the changes taking place in the hippocampus, the region generally associated with long term memory and spatial navigation. This may explain the long term neuroadaptation associated with drug use. Secondly, alterations in phospholipid and fatty acid lipid profiles in primary neocortical cells during oxidant-induced cell injury were studied. Oxidant-induced alterations in phospholipid composition can lead to decreases in membrane integrity, cell injury and even death. Neurons are especially vulnerable to lipid peroxidation. Treatment with the oxidants hydrogen peroxide (H₂O₂) and *tert*-butylhydroperoxide (TBHP) was found to increase the abundance of phospholipids containing polyunsaturated fatty acids, but had minimal affect on those containing mono- or di-unsaturated fatty acids. In addition, Group IV and VI Phospholipase A₂ (PLA₂) were found to have differential roles in oxidant-induced neural cell injury based on the use of the group specific inhibitors, methyl arachidonyl fluorophosphonate (MAFP) and bromoenol lactone (BEL) respectively.

Behavioral Changes Following Daily Practice of Saccade Tasks in Schizophrenia

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People with schizophrenia show impairment in tasks requiring executive control, like inhibition. A simple test of inhibition is the antisaccade task, which requires a glance towards the mirror image of a peripheral cue. The goal of this study is to determine how practice on the antisaccade task changes performance on that task and on related tasks known to assess executive control. Participants with schizophrenia and healthy

comparison subjects were assigned a single saccade task to practice daily—either antisaccades or prosaccades (glances towards a peripheral cue)—over a two-week period. Executive control was evaluated at pre- and post-test using two tasks: an ocular motor delayed response (ODR) task measured changes due to practice on a different, but related, saccade task, and the Wisconsin Card Sorting Test (WCST) evaluated whether changes in executive control could generalize beyond saccade tasks. Preliminary results suggest antisaccade practice resulted in modest antisaccade improvement for both normal and schizophrenia groups. Prosaccade practice did not affect prosaccade performance (due to a ceiling effect in both groups). Over the trials, both antisaccade practice groups showed improved performance on ODR and WCST. The schizophrenia prosaccade practice group, however, performed worse on ODR at post-test. In sum, antisaccade, but not prosaccade, practice resulted in modest improvement in performance on all tasks. This study provides evidence that saccadic performance can be malleable within certain parameters and suggests that practicing executive control tasks may be explored as a means of improving activities of daily living.

Creation of a Transposon Mutant Library in Live Vaccine Strain *Francisella tularensis*

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Tularemia is a disease of small animals and humans caused by the bacterium *Francisella tularensis*. The most virulent subspecies to humans is *F. tularensis* subspecies *tularensis*. Due to its highly-infectious nature, this pathogen was classified as a category A agent by the Center for Disease Control and Prevention. The Live Vaccine Strain (LVS) is derived from *F. tularensis* subspecies *holarctica*. LVS is avirulent in humans, but still replicates in macrophages and causes a lethal infection in mice. Therefore, identifying LVS genes that are required for intra-macrophage survival should also aid in efforts to attenuate the category A strain. The transposon Tn5 is a mobile genetic

element that inserts into the target DNA with very little site-specificity, resulting in virtually-random transposition. To generate a transposon system that functions in *Francisella* species, a Tn5 transposome was constructed containing the gene encoding green fluorescent protein (GFP) and the gene encoding hygromycin resistance under the control of *Francisella* promoters. Transformation into LVS should result in GFP-expressing transformants resistant to hygromycin. As transposition is a rare event, experiments are underway to optimize transformation into LVS. The optimized conditions should enable the isolation of a large set of transposon mutants which can then be screened for failure to replicate in cultured macrophages. The transposon is engineered to facilitate the identification of its chromosomal location. Identifying the disrupted genes is a first step in understanding the mechanisms by which *F. tularensis* bacteria escape killing by the host.

Development of Alternate Sources of Macronutrients for a Sustainable Algal Biofuel System

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A major concern for our economy and environment today is the efficient production of alternative fuels. Algae are an attractive, fast growing source of biomass. Microalgae require nitrogen and phosphorus for growth. However, the prices of these currently mined nutrients have more than doubled over the past year alone (P: \$252 to \$1250/metric ton; N: \$277 to \$452/metric ton). Poultry litter is a common and inexpensive source for these nutrients. It is composed of most macronutrients and trace elements necessary for optimal plant growth. The approximate percent compositions of nitrogen and phosphorus in a given sample of poultry litter are 3.2% and 1.5%, respectively. The extraction follows previously determined methods. Serial dilutions were done to quantify N and P concentrations. Then 7 strains of microalgae, including *Tetraselmus chuii*, *Dunaliella parva*, *Phaeodactylum tricorutum*, *Tetraselmus suecica*, *Pleurochrysis carterae*,

and *Dunaliella tertiolecta*, were grown in different concentrations of poultry litter extracts (PLE) with varying N and P content. After inoculating all strains and measuring biomass after daily intervals, the best performing strains and best dilution of PLE will be identified. If PLE is optimized according to turbidity and nutrient content and provided as the nutrient source for tested species of microalgae, it will be the most economically effective and sustainable way to produce alternative fuels (>15,000 gallons of fuel/acre). By extracting the nitrogen and phosphorus from PL and using it to cultivate microalgae to produce biofuels, we will potentially have a technology that is both inexpensive and applicable in many areas.

The Role of Integrin Activation in Increased Gliogenesis of Human Neural Stem Cell Cultures

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Human Neural Stem cells (hNSCs) have the potential to replace brain cells in patients with neurodegenerative disorders and are derived from human embryonic stem cells. Neural cell adhesion and development depend on integrins, which are integral membrane proteins that act as bidirectional signaling molecules. Using integrin activation, hNSCs can adhere to a substrate or implant in the brain to replace degenerated cells. Through activation of integrins, it is hypothesized that manganese will direct cells to a glial fate more rapidly than random differentiation. This study's objective is to obtain an increased rate of gliogenesis due to perturbation of integrin activation, which will result in a more purified glial cell population. To increase the rate of gliogenesis, 0.3 mM MnCl₂ differentiation media will be added, and hNSCs will be differentiated for 0, 14, 21, 28, and 35 days on polyornithine and laminin-coated plates. mRNA will be isolated from each treatment using the Qiagen RNeasy kit and cDNA will be synthesized. RT-PCR will determine glial cell gene expression of the following seven genes: GFAP, GLAST, IL6, CD44, CNTFR, Aqp4, and VIM. Immunocytochemistry will be performed

by fixing cells in 4% paraformaldehyde and staining using standard immunofluorescence protocols. Antibodies against representative glial proteins will be used. Protocols for differentiating purified populations for future use in cell therapy can be obtained. Ultimately, if the quantity of glial cells in a purified population is known, then patient-specific cells can be generated for the replacement of brain cells in patients with neurodegenerative diseases.

Human Disease and the Kit/KitL Signaling Pathway

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Kit ligand (Kitl) is the ligand for the class III receptor tyrosine kinase Kit. In vertebrates, the Kit/Kitl pathway is involved in the development and proliferation of germ cells, melanocytes, and hematopoietic cells. In this pathway, a cell secretes or expresses Kitl, which can then bind Kit on another cell. Upon binding, Kit dimerizes and a reaction cascade is initiated within the cell expressing Kit. This pathway is important in multiple differentiated cell types. Kitl has been shown to be an important cytokine in recruiting and activating mast cells during inflammation. This increased expression of Kitl has been linked to tumor-related inflammation. Kit has also been linked to multiple forms of cancer. Gastrointestinal stromal tumors (GISTs), germ cell seminomas, and acute myeloid leukemia have been linked to constitutive activation of Kit. GISTs, which are mesenchymal neoplasms in the GI tract, are probably the most well-studied diseases with regards to constitutive activation of the Kit/Kitl pathway. Kit has also been found to be over expressed in a number of carcinomas. Possible pharmacological interventions for treating disorders related to the misregulation of Kit or Kitl include inhibitors of Kit or a dominant negative Kit protein. However, these treatments are not effective against all activating mutations in Kit. This pathway and the role of Kit in disease must be examined further so that more effective treatments can be designed.

Changing Places: Examining the Role of Place in Invisible Theater Performance

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This research focuses on the role of place in invisible theater performances. Invisible theater is a subset of Theater of the Oppressed developed by Augusto Boal in the early 1970s, while he was living in exile in Argentina. Wanting to continue political performances but living under a repressive regime, he and his companions began performing scenes in public places without anyone realizing that a performance was occurring. The scenes address pertinent social issues with the aim of creating dialogue. My research questions how the same invisible theater performance changes when performed in different places. To begin this research I attended the Pedagogy and Theater of the Oppressed Conference, and reviewed a variety of texts, including *Theater of the Oppressed*, *Games for Actors and Non-Actors*, and Boal's auto-biography *Hamlet and the Baker's Son*. I have continued my research by forming a troupe, who have spent the year developing and performing invisible theater scenes. The culmination of the research is a scene addressing domestic violence. This is performed in a variety of places, such as a large corporate shopping center, a small, locally-owned store, a fast-food restaurant, an outdoor setting, and a sports event. Qualitative data are collected through troupe members' journals and recordings of the troupe's post-performance discussions, in which members are asked to address specific questions, such as, "How did you alter your performance to adapt to the environment? What types of technology were present? Did these hinder your attempts to involve audience members?" This research will contribute greatly as there is little research done on this fascinating topic.

The Effects of Fetal Genomic Expression of TNF-aRI and TNF-aRII in *P. chabaudi* complicated Murine Pregnancy

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Malaria is known to cause complications during pregnancy, including low birth weight, anemia, high-density parasitemia, and spontaneous abortion, greatly contributing to the morbidity and mortality of the disease for both mothers and babies. It is known that immune response to the disease significantly contributes to the disadvantageous consequences of malaria-complicated pregnancies. Malaria elicits a type 1 cytokine response. This cellular response to infection uses cytokines to control infection. TNF-a, one such cytokine specific only to the Th1 response, has been shown to have detrimental effects on pregnancy. TNF helps to control malaria by lowering parasitemia, but in turn increases severity by activating an inflammatory response. TNF levels increase in response to malaria. This increased TNF expression has been linked to severity, parasitemia, and fever as well as poor infant outcome. There are two TNF-a inhibitors that have been identified, sTNFR-I and sTNFR-II. These inhibitors are cell-surface receptors truncated by proteolytic cleavage of p55TNF-R and p75TNF-R respectively. The soluble receptors and TNF-a interact by forming a complex that exhibits control over TNF levels. This research aims to determine whether maternal TNF expression or fetal TNF expression is responsible to poor infant outcome in malaria-complicated pregnancy. Female mice with double knockout for TNF receptors were bred with control males and infected with *P. chabaudi chabaudi*. The data collected compare fetal outcomes of pups with and without TNF receptors that are born of malaria-infected, TNF-receptor-absent mothers. Viability of pups after a regulated malaria infection during pregnancy is associated with the absence of TNF receptors in the fetus.

Art & Engineering: A Binocular Vision

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A modern-day Leonardo da Vinci, Dutch artist Theo Jansen claims that “the walls between art and engineering exist only in our minds.” What happens when we break down these walls and use tools from both the arts and the sciences to bring our ideas into being? To understand, replicate, and enhance aspects of the natural world—these are the goals of both the artist and the inventor. Both are creators who hope to take the matter around them and give it form and give it life. Drawing on studies in computer science, engineering, and mathematics, these artworks will explore the relationships we have with technology, science, nature, and culture, as well as the relationships these have with one another. What happens when both the artwork and the viewer have the ability to sense and respond? Can mathematics be used to create beauty? How can virtual reality be used to develop a more immersive, synaesthetic space that the viewer is able to explore? Just as binocular vision gives us the perception of depth, so an interdisciplinary approach taken from multiple perspectives can provide us with a depth of understanding that allows us to answer questions like these.

Artworks in progress include an interactive video projection which responds to the viewer's footsteps, paintings created with fractals, and excursions into the medium of robotics.

Neuromuscular Activation and Movement Kinematics Exhibited During Sit-to-Stand by Multiple Sclerosis Individuals

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Multiple sclerosis (MS) is a chronic and progressive inflammatory disease that adversely affects the central nervous system of an estimated 2.5 million people worldwide. Neural sheath degeneration and subsequent plaque formation underlies the physical limitation seen in MS people (MSP). Given the large MSP population, research dedicated to the

development of therapeutic programs is necessary. The purpose of this study was to compare the kinematics and muscle activation between MSP and those without MS (nonMSP) during the functionally demanding, sit-to-stand (STS) movement. A sample of 7 MSP with self-reported EDSS scores of ≥ 3 and 6 matched-control nonMSP were tested. Participants first signed the institutionally-approved consent form and proceeded to produce a standardized isometric knee-extensor torque used later for electromyography (EMG) normalization. Five STS trials were then performed, while EMG for the rectus femoris (knee-extensor) muscle and electromagnetically tracked spatial locations of the lower extremities and the lower spine were recorded. Compared to nonMSP, MSP displayed significantly less ($p < 0.05$) normalized EMG during the rising phase of STS. Kinematic data showed that MSP display greater trunk flexion and increased trunk flexion velocity during STS. These trunk movement changes increase momentum of the body before liftoff and are most likely movement strategies to compensate for the reduced knee extensor muscle activity found in MSP during STS. These data additionally showed that MSP utilized a greater rise time for the STS movement. The results indicate that these MSP have reduced functional ability to perform STS even with compensatory strategies. A current pre/post study evaluating the functional capacity of MSP after a flexibility or strength training intervention will provide insight regarding the effectiveness of such interventions on enhancing the functional ability of those diagnosed with MS.

Berg Balance Score Correlates to Postural Stability Measures

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Falls due to loss of balance are common in individuals with Multiple Sclerosis (MS), but clinical methods of measuring balance may not be sensitive enough to detect subtle deficits. Our purpose was to determine if Berg Balance Scale (BBS) scores were correlated to instrumented postural stability measures in individuals with

Expanded Disability Status Scale (EDSS) scores <6.5. The BBS was performed and scored according to standardized instructions. The NeuroCom SMART Balance Master Sensory Organization Test was used to test static and dynamic balance. Participants underwent the testing procedure twice, only data from the second session were used. Raw ground reaction force data were converted into postural stability measures (center of pressure displacement, velocity, and sway area). Bivariate Pearson correlations ($\alpha=0.05$) were used to measure relationships between BBS scores and center of pressure (COP) measures. Because 6 correlations were analyzed, the alpha level was adjusted to 0.008 (0.05/6). Male participants ($n=4$) had a mean age, height, weight, and EDSS of 48.5 ± 6.40 years; 179.39 ± 6.99 cm; 90.43 ± 16.83 kg; and 2.75 ± 2.60 . Females ($n=15$) were 40.93 ± 11.77 years; 166.25 ± 6.59 cm; 78.27 ± 21.28 kg; 2.47 ± 1.90 . The BBS was significantly and negatively correlated with eyes closed/stable platform COP displacement ($r = -0.633$, $P=0.006$), velocity ($r = -0.633$, $P=0.006$), and sway area ($r = -0.757$, $P=0.0004$). As BBS scores decreased (indicating decreased function), COP displacement, velocity, and sway area increased (indicating worse balance). It appears that BBS is correlated with traditional instrumented postural stability measures in individuals with ambulatory EDSS scores. The BBS appears to be reflective of postural stability in this population.

The Empowerment of Character Expression through the Use of Popular Culture in the Novels of Manuel Puig

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Manuel Puig’s writing has remained a much debated and much studied topic, especially in relation to his own personal political and social views. What is most intriguing about Puig though is his use of foreign popular art and culture to develop ideas and plots that take place in Argentina. Puig’s use of literary techniques, in addition to his unusual use of popular art and culture as tools in the elucidation of his

characters and plot events, is particularly fascinating. This thesis is an exploration of Puig’s use of foreign, particularly American, mass culture art and media, referred to as popular art from here on out, in the development of characters and mindsets in Manuel Puig’s first four novels: *La Traición de Rita Hayworth*, *Boquitas Pintadas*, *The Buenos Aires Affair*, and *El Beso de la Mujer Araña*. In these novels, the presence of foreign popular art is very noticeable and plays a key role in the ultimate structure and meaning of the novel, particularly with respect to the presence of a character’s “imaginary,” what can be deemed as his or her alternate realities, versus the presence of his or her “real” life. The use of the foreign popular art is different in each novel and is highlighted through various literary techniques employed by Puig, particularly in the use of local popular art expressions, which he juxtaposes with that of foreign popular art, creating a type of cross cultural enigmatic, both physically and mentally, setting and character development. Puig focuses on embracing popular culture with a marked lack of artistic snobbery or distance so often associated with other literary minds, which serves as another point of investigation for his utilization of popular culture, especially foreign culture, and his novel use of its artistic impression as a reflective influence on character, plot, and form.

Which Factors Influence the Voting Practices of the Members of the United Kingdom Parliament on Legislation Concerning the Use of Force by the State in Military Interventions?

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Military interventions conducted by state powers are not the result of the actions of a single entity or a single factor. There are many factors at different levels of the global system that have influence over a military intervention. Focusing on the role that individuals and governments have in a military intervention will help to better understand the nature and the outcome of that intervention. This study focuses on the state

power of the United Kingdom and its Parliament in the post Cold War setting. There has been previous research done on the voting practices of the political elite of the United States. However, this study focuses on gender, previous military experience, and party membership of the Members of Parliament (MPs) in the United Kingdom to see how those factors impact the voting practices of MPs when it comes to issues of the use of force by the state. In order to conduct the study, research is done on all Parliament sessions and its members since 1991. To investigate the three factors, biographies and profiles of the MPs are researched. Additionally, the voting records of all MPs on pieces of legislation pertaining to the use of force are also studied to see how they voted. The voting records and the three factors are studied together to see if and how they influenced the voting practices of members of Parliament. The primary purpose of the research is to show how focusing on individuals and governments helps to provide a better understanding of how and why a military intervention is conducted by a major power and how it is ended.

Georgia Senate Bills 440 and 441: The Effectiveness of the Adult Criminal System as a Deterrent to Juvenile Recidivism

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In 1994, the Georgia Legislature passed The Juvenile Justice Reform Act, also known as Georgia Senate Bill 440, in response to the increasing number of crimes committed by youth between the ages of thirteen and seventeen. One specification of the bill requires that youths who commit one of the seven major crimes—including murder, rape, armed robbery, aggravated child molestation, aggravated sodomy, aggravated sexual battery, and voluntary manslaughter with the use of a firearm—are tried in court as adults. Once convicted under Senate Bill 440, Senate Bill 441 imposes a mandatory minimum sentence of ten years in an adult prison without parole. This research will utilize a quasi-experimental design with a nonequivalent control group. Aggregate

data from the Georgia Department of Juvenile Justice will be used to analyze the detrimental effect of Senate Bills 440 and 441 on youths. It will focus on rates of recidivism, or the relapse into crime within a year of release from prison, as well as the disproportionate incarceration levels for youths of color compared to white youths, to measure the negative impact of these measures. In order to address these violent crimes, amendment of this legislation by the Georgia legislature, in conjunction with local governments, to prohibit mandatory minimum sentences and incarceration in adult criminal systems for convicted youth is vital. Intensive rehabilitation centers that focus on building education would be a viable alternative. This will mark an effort to reduce the achievement gap between minority and white youths and deter recidivism.

Comparison of Gnt-V Expression in Different Human Carcinoma Cell Lines

Nirzari Patel

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N-acetylglucosaminyltransferase V (GnT-V) is an enzyme that catalyzes β 1-6 branching of N-acetylglucosamine on asparagine (N)-linked oligosaccharides (N-glycans) of cell proteins. Increased levels of GnT-V glycan products are associated with increased tumorigenesis and metastatic behavior in many *in vitro* cell lines. Although GnT-V is known to be important in tumor metastases, the expressing of it in different mammary and tumor cells is not fully defined. In this study, the three mammary carcinoma cell lines, MCF-7, MDA, and SK-BR, are utilized to assess the expression of GnT-V. The MCF-10A, (control) a non-cancerous cell line, expresses proteins of interest associated with breast cancer in humans which gives invasiveness properties. Similar to normal human breast epithelial cells, at confluence the MCF-10A cells form dome structures in tissue culture plates and produce mammary spheres in 3D collagen culture. These characteristics make MCF-10A cells a model of choice for breast tumor progression studies. The MCF-7, MDA, and SK-BR carcinogenic cell lines are compared

on the amount of gene expression and product output. MCF 7 tumor cell line is non invasive, while MDA cell line is very invasive, and the SK-BR cell line is invasive with an expression of Her 2/ neu gene. These established cell lines are used for comparative breast cancer research and used to evaluate new therapy approaches *in vitro* prior to *in vivo* testing. In this experiment, western blots are carried out in attempt to understand the expression of GnT-V in comparison with other membrane proteins related to tumor invasiveness. Lectins and antibodies are then applied to the membrane and data are analyzed. At this point, the data are being compiled. However, in the future, the results to my data will suggest that GnT-V expression level could serve as a useful tool for tumor analysis in breast cancer.

Directed Differentiation of Neural Progenitor Cells into Glial Progenitor Cells

Tulsi Patel – CURO Scholar

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Human embryonic stem cells are pluripotent cells that have the potential to differentiate into all cell types found in the human body. The Stice Lab has previously derived neural progenitor (hNP) cells, which can be further differentiated into neurons, from human embryonic stem cell lines. Currently, the media used for cell proliferation comprises neural basal media supplemented with B27, Leukemia Inhibitory Factor, Fibroblast Growth Factor 2, and L-glutamine. All of these are defined components except B27, which is composed of a defined supplement, N2, and other anti-oxidants and factors. To better understand the role of all these factors on neurons, hNP cells were grown in various concentrations of B27 ranging from 0 to 1XB27. 0.1X B27 was sufficient for hNP proliferation. Additionally, RNA analysis data from differentiated neuritis that were proliferated in 0.5X B27 and 0.1X B27 media showed a significantly higher expression of Glial Fibrillary Acidic Protein, a marker used to identify glial cells, when compared to our control cells. These observations indicate that hNP cultures proliferating in lower

concentrations of B27 differentiate into glial-like cells. Further experiments to detect GFAP protein levels in these cell cultures will be performed to further support this hypothesis. Glial cells provide support and nutrition for neurons in the central nervous system. Defining a uniform culturing condition for these cells could help understand and cure glial-degenerative diseases like Multiple Sclerosis, Alzheimer's, and Alexander's Disease.

U.S. Involvement in Government Coups in Angola During the Cold War

Hadas Peles

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In describing the United States as a global Empire of Bases, Chalmers Johnson's writing of the history of U.S. Militarism in *Blowback* and *The Sorrows of Empire* largely ignores U.S.-sponsored covert operations and involvement in the continent of Africa. However, many of the patterns Johnson describes as products of U.S. foreign policy in other parts of the world mirror, reiterate, and reveal much about the worsening relationships between the United States and various African countries. The creation of AFRICOM, the newest of U.S. combatant commands, brings about many questions regarding the future of U.S.-African relations. By exploring the history of U.S. entanglements in various regions in Africa during the Cold War era, largely focusing on Sub-Saharan Africa and Angola, this research will contextualize the current, 21st century challenges of developing and executing U.S. Foreign Policy, especially militarily, in those African regions. Additionally, exploring African newspaper archives from the last nine years yield the causes of the flailing relationships due to past and most current U.S. military endeavors. In particular, this research focuses heavily on the growing controversy of creating a permanent U.S. military presence within the African continent, a land only recently released from the shackles of imperial imprisonment.

“He Can’t Do This To Me!” Military Assistance, the Response of Concerned Powers, and Implications for U.S. Aid to Ukraine

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The United States currently provides large amounts of military aid to Ukraine in an attempt to modernize its military and make its military forces more compatible with those of NATO. This assistance is also seen as a precursor to Ukraine’s eventual NATO accession. There is some concern that the process of binding former Soviet states into tighter military relationships with the United States could worsen the already strained relationship between the U.S. and Russia. While a significant amount of research has focused on the potential costs and benefits of NATO accession for countries in the region, the motivation for giving military aid and the effect the aid has on Russian perceptions has been less thoroughly studied. This paper will examine Soviet arms sales to Egypt in 1955, the Cuban Missile Crisis of 1962, and ongoing American arms transfers to Taiwan in order to assess the relationship between military aid and the perception and actions of concerned major powers. Furthermore, this study disaggregates symbolic (pride, prestige, ideology) from material (concern for the balance of relative power, leverage) concerns and analyzes which factors played a greater role in motivating the actions of the state giving aid and the response of the "target" state of the aid. Examining these cases reveals that although states are concerned about intangible symbolic factors, it is material factors that are of greater importance in both the giving of aid and response to said aid. Additionally, given this concern with material issues, states are likely to forego a particularly aggressive response to aid that is intended to curb their influence because of the potential consequences of such action. Thus, American military aid to Ukraine is not likely to trigger an overbearing reaction from Russia given the potential consequences of further deteriorations of the U.S.-Russian relationship. This conclusion suggests that it is

possible for the United States to use military aid to further its interests in Ukraine and other former Soviet states and focus on the benefits that this aid could have for the nations it is given to (enhancing military professionalism to further democratic consolidation in those states, for instance), rather than on the potential Russian response.

The Ideal Religious Experience

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In previous studies, participating in religious experiences has correlated with overall happiness and an easier time coping with loss. This experiment is attempting to help researchers discover the best type and place for a person to achieve a religious experience and whether religiosity is useful for people. Participants were asked to answer a number of different surveys and open-ended questions. The different surveys used were the Allport and Ross Religious Orientation Scale, Batson’s Quest Scale, the NEO-FFI scale, and a religiosity scale designed by Laura B. Koenig, Matt McGue, and William G. Iacono. The different surveys were used to categorize the participants into categories relating to their personalities, religiosity, and background information. The open-ended questions help determine what the participants believe is important in their ideal religious experience and where they can achieve it. The answers to open-ended questions were categorized into five different categories for each question. In the first question, the participants said that in their ideal religious experiences they either experienced a sense of connection, security, positive feelings, clarity, or not possible. In the second question, the participants said that they were most likely to achieve their ideal religious experience anywhere, during crucial events, in a religious place, alone, or with others. These different categories were determined based on common phrasing found in the open-ended questions. The study found that people who truly believe in their religion tend to have higher levels of agreeableness, conscientiousness, and

extraversion. Also, several different dimensions of personality are correlated to the types of ideal religious experiences they receive. For example, people who have intrinsic religious personalities are more likely to have religious experiences where they feel secure, while people who are more extraverted and not neurotic are statistically more likely to have their ideal religious experiences when they are alone.

Comparing Population Size Estimators for Stream Plethodontids

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Plethodontid salamanders are among the most abundant vertebrates of forested ecosystems in the eastern and northwestern United States. Southern Appalachian streams are hotspots of diversity for semi-aquatic plethodontids; a single stream may include more than a dozen plethodontid species and larval densities as high as 60 per m². Stream plethodontids are one of the most profuse predators of first and second order streams and are important nutrient sinks because of their remarkable abundance and metabolic efficiency. Despite their considered importance, very little is known about the effects of plethodontids on ecosystem processes, and few studies have estimated absolute abundances of salamander populations. This research will compare abundance estimation of four stream plethodontid species by means of the mark-recapture method. The project will use pre-existing data from a mark-recapture study of these species across six streams at the Coweeta Hydrological Laboratory LTER site. The different categories of mark-recapture models will include closed-population, open-population, and robust design models to demonstrate how different model assumptions can result in a wide range of population estimates. We predict that Pollock's robust design model will be the most appropriate population abundance estimator because of its flexibility to incorporate variation in capture probabilities and to estimate temporary emigration probabilities. Because these abundance estimates will be coupled with data examining the role of plethodontids in

nutrient cycling and storage in forest ecosystems, this study will provide a better understanding of the current effects of stream plethodontids on stream processes.

Characterizing RNA-Protein Complexes Involved in Genome Defense in Prokaryotes

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Ribonucleoprotein (RNP) complexes are ubiquitous macromolecular machines involved in most major aspects of cellular function. Various proteins and non-coding ribonucleic acids (ncRNAs) form distinct RNP complexes. We are interested in characterizing novel RNP complexes in *Pyrococcus furiosus*, an organism in which our lab is studying a new class of ncRNAs. These ncRNAs are implicated to function with a set of related proteins in an RNA-based genome defense system in prokaryotes. In order to investigate these hypothetical RNP complexes, I have generated antibodies to putative protein components of these complexes from antigens purified via an *Escherichia coli* expression system. These antibodies are being used for co-immunoprecipitation experiments to identify protein-protein and protein-RNA interactions within the RNP complexes. Once a basic understanding of the RNP complexes is attained, functional studies will be expedited. This research will be used as a framework for manipulation of this biological system for the design of novel nucleic acid-based antibiotics as well as for experimental gene manipulation.

The Role of Microtubules in the Degradation of Hirano Bodies

Cleveland Piggott

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Hirano bodies are intracellular, paracrystalline, actin-rich structures that are most commonly found in the autopsied brains of humans

suffering from neurodegenerative diseases. Thus, their physiological role(s), beneficial or deleterious, are not well understood, but their possible link to the prevention, cure, and further understanding of neurodegenerative diseases and aging has made their study worthwhile. Recently, an *in vitro* model to induce formation of Hirano bodies in living cells was discovered. This model allows questions regarding the physiological effects, the formation, and degradation of Hirano bodies to be investigated in living cells. The two major ways in which cellular components are degraded in a cell are either through the protein complex known as the proteasome or by the autophagy pathway. Autophagy is a catabolic process of self degradation that requires multiple components in order to function properly. These components must be transported via one of the two major cytoskeletal transport components in a cell, actin or microtubules. We hypothesize that microtubules play a major role in the degradation process of Hirano bodies through autophagy. To test this, *Dictyostelium amoeba* expressing Hirano bodies were treated with nocodazole, a microtubule depolymerizing drug. These cells were stained after various times of nocodazole exposure and Hirano body size measured. Results showed no difference between Hirano body size with and without nocodazole at all time points. Further experiments will be run using Atg8, an autophagy marker, to distinguish the difference between formation and degradation of Hirano bodies. Once the role of Hirano bodies in neurodegenerative diseases is elucidated, these experiments will help in providing a means to prevent or accelerate the degradation of these highly ordered protein structures.

Imagining Constantinople: Imperial Houses of Worship as Symbols of State Ideology

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Architecture physically embodies the priorities and ideologies of the culture in which it was constructed. When built as a function of an

imperial government, architecture visually represented the ideological goals of the state. The site selection, scale, and design of a building or complex reflected the overall goals of a state or its ruler. When the Ottoman Empire conquered Constantinople, capital of the Byzantine Empire, its sultans used architectural constructions to manifest the change in imperial rule. Because construction techniques were not as convenient and efficient as in the modern period, carrying out large-scale projects in this period required time, energy, and wealth to sustain the project's completion. Therefore, constructing monumental buildings and complexes became a symbol of the imperial stability, power, and resource availability of the Ottoman Empire. This paper explores the explicit connections between ideology and design at Hagia Sophia (rebuilt in 562 CE by the Byzantine Emperor Justinian I), the complex of Sultan Mehmed II (1463-1470 CE), the Bayezid II mosque (1501-1506 CE), the Suleymaniye complex (1550-1557 CE), and the Sultan Ahmed mosque (1609-1616 CE). These houses of worship show the changing landscape in Constantinople during years in which imperial control of the city shifted from a Christian to an Islamic state. They serve as examples of how rulers, both Byzantine and Islamic, manipulated the urban plan of the city of Constantinople to construct buildings that enhance state ideology and eminence.

Age-Dependent Susceptibility to *Enterobacter sakazakii* Infection in Neonatal CD-1 Mice

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Premature or low-birth-weight infants are susceptible to infection by the bacterium *Enterobacter sakazakii*, which has been isolated from powdered infant formula. Clinical cases have indicated that younger infants are more susceptible to infection than older infants, sometimes leading to meningitis or death. Our objective was to determine the ages at which neonatal CD-1 mice were most susceptible to infection and at what age, if any, susceptibility

decreased. Neonatal CD-1 mice were orally gavaged with reconstituted powdered infant formula infected with three different doses (10^3 , 10^7 , and 10^{10} CFU) of *E. sakazakii* to three different age groups: postnatal days (PND) 1.5, 5.5, and 9.5. Mice were sacrificed one week after treatment; blood, liver, cecum, and brain tissue samples were taken. Deaths before time of sacrifice were noted. *E. sakazakii* presence was determined by enrichment and direct culture. Identity confirmation was done by biochemical analysis. *E. sakazakii* was isolated from ceca and liver tissues of animals treated at PND 1.5 more frequently than from PND 5.5 (ceca =18% vs 1%; liver= 14% vs 7%). PND 1.5 neonates were also much more susceptible to infection of the brain (22%) than PND 5.5 (2%). Only the PND 1.5 group showed mortalities (11%) confirming the severity of the infection. PND 9.5 mice did not appear to be susceptible; no *E. sakazakii* was isolated from any tissue at any dose. This research suggests that younger neonates are much more susceptible to *E. sakazakii* infection than older neonates, which is in agreement with reported cases in humans.

Approaches to the Refugee Humanitarian Crisis: An Examination of Refugee Trends and What Promotes Progress

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With over four million displaced Iraqis, the Iraq refugee crisis is the worst in the world. This project seeks to identify the policies and initiatives that most effectively lowered refugee populations in protracted situations. Using the crisis examples in Myanmar, OPT, Somalia, and Sudan, we gathered statistical data from the UNHCR and constructed time series models to represent the refugee population in each country from 1992-2007. We then connected interruptions in the data trends with actual events that caused them. Upon analysis, we identified the following as factors that impact the refugee population for a specific time period: (A) the coordination of cooperation between the UN, NGOs, local organizations, local government, and the government of surrounding

countries is paramount in any refugee crisis; (B) UN resolutions have proven to be extremely effective in decreasing the refugee population for the years to follow when the main countries causing the conflict and creating refugees agree to abide by the terms; (C) peace agreements among warring militias are effective for a short period of time; (D) sanctions and embargos on countries whose government commits human rights violations do not help the conditions for the victims; (E) free and independent media access is necessary in any problem area. These findings are significant contributors to the formulation of Iraq refugee crisis policy. In general, research of migratory movement due to conflict is an extremely important field that will continue to grow due to its irrefutable relevancy to the condition of the global community.

Development of a System to Create Unmarked Mutations in *Mycobacterium tuberculosis*

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One third of the world population is infected with *Mycobacterium tuberculosis*. Annually, 7 to 9 million infected individuals suffer from active tuberculosis disease resulting in 1.5 to 2 million deaths. Attenuating *M. tuberculosis* to produce a safe, live vaccine will likely require deletion of multiple chromosomal genes encoding virulence factors. A common system used to delete genes from this bacterium utilizes a specialized transducing phage to mediate the replacement of a mycobacterial gene with an antibiotic resistance marker via homologous recombination. As a vaccine strain encoding multiple antibiotic resistances may lead to transfer of antibiotic resistance genes to other bacteria, we are developing a modified system to enable replacement of any chromosomal gene with a gene cassette that will facilitate the study of the resulting mutants and can also be used to subsequently remove these foreign genes from the chromosome. This is a multi-step process that involves generating a final plasmid with a cassette that has the following features: a hygromycin resistance gene (*hyg*), a gene

encoding green fluorescent protein (*gfp*), and a sucrose counter-selectable gene (*sacB*). The plasmid will also encode an origin of replication for *E. coli* (*oriE*), a bacteriophage lambda *in vitro* packaging site (*cosA*), and a unique site for the DNA restriction enzyme *PacI* for ligation to transducing phage DNA. The details of this system and the intermediate plasmids constructed to date will be presented.

An Analysis of the Effects of Parent-Child Quality of Relationship and Parental Emotion Socialization Practices on Youth Psychosocial Functioning

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Understanding influences on children's emotional development has been given much attention by researchers due to the connection between emotional competence and youths' broader psychosocial adjustment. In particular, parents' have been identified as an important contributor to youths' emotional development. A lack of emotional competence has been indicated in various forms of psychopathology (e.g., anxiety, depression; Casey, 1996; Cicchetti et al., 1995; Cole, Michel & O'Donnell-Teti, 1994), which indicates the impact of emotion expression and regulation on people's capability for adaptive functioning. The current study aims to further explore relations between parent emotion socialization practices, parent-child relationship quality, and youth psychosocial functioning. These relations will be analyzed based on both surveys as well as behavioral observations. It is expected that: 1) parental encouraging emotion socialization practices will be positively related to a higher quality parent-child relationship and adaptive child psychosocial functioning, and 2) quality of parent-child relationship will be positively related to adaptive youth psychosocial functioning.

Understanding the Cell Cycle: Cyclin-Dependent Kinase Phosphorylation of Hcm1

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The cell cycle is a series of biochemical events regulated by many molecules, including transcription factors, by which the cell duplicates. Not only is knowledge of the cell cycle critical for understanding normal human development but also when this cycle goes awry, it can lead to illnesses such as cancer and possibly Alzheimer's disease. We propose that Hcm1, a transcription factor that regulates the expression of genes in other parts of the cell cycle, is phosphorylated by a protein called cyclin-dependent kinase, specifically CDK1. We hypothesized that the inhibition of CDK phosphorylation of Hcm1 alters the percent of cells in the G1 phase of the cell cycle. In a yeast strain where the HCM1 gene was deleted, plasmids containing the WT HCM1 gene (a wild type gene is the naturally occurring gene) were compared with plasmids containing a mutant version in order to test our hypothesis. The results generated by flow cytometry were compared using t-tests to conclude if there was a statistical difference between the four designs being tested. We found that the mutant protein alters the percent of cells in G1. This study should lead to information that may be useful for individuals studying stem cells and cancer because it provides a missing link in understanding the subtleties of the cell cycle.

Steamed Ginger Supplementation Reduces Pain Following Eccentric Exercise-Induced Injury

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We recently found that 11 days of supplementation with 2 grams of raw, ground ginger reduced arm muscle pain, inflammation and disability induced by eccentric exercise. These effects could plausibly be attributed to compounds in ginger such as gingerols and shogaols that act on vanilloid receptors. The purpose was to determine whether 11 days of

supplementation with ginger treated by steaming, a process known to increase the concentration of shogaols, also influences arm muscle pain, inflammation and disability induced by eccentric exercise. Raw ginger was ground and heated for 3 hours and 15 minutes at 100°C and dried. Ginger and placebo was placed in hypromellose capsules. 40 participants were randomized to consume either 6 ginger or 6 placebo capsules daily for 11 consecutive days. On Day 8, participants performed 18 eccentric actions of the non-dominant elbow flexors at an intensity of 120% of their concentric one-repetition maximum. Before and for 3 days after eccentric exercise, assessments were made of arm volume, arm range-of-motion, isometric strength, pain intensity and perceived effort (RPE) responses to three flexions and extensions of the elbow at 50% of the concentric one-repetition maximum. Post-hoc tests showed that pain and RPE were substantially lower in the ginger group 24-hours after eccentric exercise. Range-of-motion was not influenced by the intervention and small effect size differences in arm volume and isometric strength 24-hours after exercise favored the ginger group but did not reach statistical significance. Supplementation with steamed ginger reduces muscle pain and perceptions of effort the day after eccentric exercise.

On Faith

Joe Reynolds

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What does it mean to have faith in God? To Nicholas of Cusa, a 15th century Cardinal, serious examination of the intellect, love, and hope must be undertaken before faith can be understood. In analyzing each concept and its relation to faith, comparisons shall be made with Plato to highlight similarities among the ancient and medieval traditions. First, it shall be necessary to understand how the intellect enables the individual to be transformed by God. To understand this, a thorough analysis of the nature of the individual must be undertaken, and Plato's characterization of the soul and its desire shall be used as an aide in highlighting

similarities. Next, the role of love in enabling the individual to pursue this transformation shall be studied, as well as the role of hope in intensifying this love. After clarifying the previously mentioned concepts, this paper then intends to provide the reader with a proper understanding of a faith in God. In comparing this with a faith not centered on God, the implications of both "life-choices" shall be studied, and, in particular, emphasis shall be placed on how the individual experiences life. In the end, this paper intends to understand why Nicholas of Cusa suggests that by having a 'right' faith, the individual perfects his nature.

Evaluating the Antibody Response to Respiratory Syncytial Virus (RSV) for the Inhibition of the RSV G Protein Interaction with the CX3C Chemokine Receptor

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Respiratory syncytial virus (RSV) is a primary cause of severe lower respiratory illness in infants and children worldwide, also causing substantial disease in the elderly and immune-compromised populations. Previous research has shown that the RSV attachment protein (G protein) interacts with the CX3C chemokine receptor (CX3CR1) during the infection process to modify anti-viral immunity linked to the activities of fractalkine (CX3CL1), the natural ligand of CX3CR1. Evidence suggests that prevention of RSV G protein-CX3CR1 interaction reduces RSV replication, and thus this G protein-CX3CR1 interaction can be targeted as a possible vaccine strategy to mitigate RSV disease pathogenesis. For this study, we are testing different anti-G protein blocking antibodies developed in mice inoculated with RSV to determine if these antibodies can prevent or reduce G protein attachment to CX3CR1. The studies employ flow cytometry to determine the effectiveness of these anti-G antibodies at preventing the interaction between different strains of G protein and CX3CR1 expressed on mutant Chinese hamster ovary (CHO) cells. The preliminary

results suggest that these antibodies significantly reduce G protein's attachment to CX3CR1. Future studies should test the effectiveness of these antibodies in an *in vivo* mouse model. Studies on these anti-G antibodies can potentially lead to the development of the first vaccine for RSV.

Reducing Binge Drinking Among University of Georgia Students

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Each year in the United States 1,700 college students aged 18 to 24 die from alcohol-related injuries, including motor-vehicle crashes. Such accidental injuries are the leading cause of death among people 15 to 24 years old. In light of these alarming statistics, many universities, including the University of Georgia, have taken significant steps to reduce binge drinking—drinking five or more drinks within two hours. This study will assess the effectiveness of alcohol-related policy changes that affected UGA students from 2001 to 2007 based on survey data over the same time period and recommend future policy changes to reduce high-risk drinking among UGA students. From 2001 until 2007, Athens-Clarke County significantly increased enforcement of the minimum legal drinking age (MLDA). UGA also increased enforcement of the MLDA on campus, stiffened penalties for students caught violating the MLDA, and increased educational programs targeting underage students and high-risk groups. National College Health Assessment survey data, collected at UGA during the fall semester of odd numbered years, show that these changes are correlated with a large decline in underage drinking rates and a slight decline in binge drinking rates among underage students who report drinking. However, binge drinking remains a significant problem. Many underage students continue to binge. Students of legal age binge drink at even higher rates. And importantly, UGA students continue to perceive a heavy drinking culture. To further combat binge drinking, Athens and UGA must implement a tiered penalties

structure based on blood-alcohol content for underage drinking and public drunkenness violations and launch a sustained social norms campaign to combat prevalent misperceptions about UGA's drinking culture.

Natural Prevalence of *Phlebiopsis gigantea* in the Field

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The fungus *Heterobasidion annosum* (*Ha*) is the causative agent of annosum root disease, a major destroyer of commercial pine crops in the southeastern United States. Experimentation in Europe has shown the fungus *Phlebiopsis gigantea* (*Pg*) to be an effective biocontrol agent against *Ha* through competition, and *Pg* has been in use as the preferred natural control mechanism in Europe since the 1960s. However, because *Pg* is a wood-rotting pest, the United States Environmental Protection Agency will not approve *Pg* for use in the US until its risks have been fully investigated. Whether or not the physical application of *Pg* to stumps will increase its overall prevalence in the environment is of major concern. Field data addressing this issue were collected from two logging forests in northeastern Georgia, starting in July 2007 and February 2008. Petri dishes were placed on the forest floor to collect airborne spores from sites containing pine stumps treated with *Pg*, water, and controls. Spores were given a week to grow, at which time each dish was analyzed for the presence of *Pg* colonies. Our data have so far shown that the application of *Pg* to stumps does not increase the fungus' overall prevalence in the environment. This is an ongoing project that will aid in the EPA's weighing of the costs and benefits of approving *Pg* for use in the United States.

Characterizing the STE23 ORF

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According to the latest reports by the U.S. Census Bureau, 45.7 million individuals in the United States are uninsured. Despite current government programs, 31.6 percent of persons below the poverty level lack insurance, and 24.5 percent of households with an annual income less than \$25,000 have no health insurance. A large uninsured population creates numerous problems, including higher premature mortality rates for the uninsured, higher health insurance premiums for the insured, and financial and logistical pressure placed on the healthcare industry. After researching domestic and foreign health care policies, current problems, and purposed solutions, it has become clear that a new approach must be taken. The United States must implement a policy requiring all residents of the United States to purchase health insurance operating on a bracketed system established for addressing the needs of the poor and under resourced. Universal mandatory health insurance will be costly, but the long-term benefits of this policy will far outweigh the initial costs. The socioeconomic benefits include the potential to lower health insurance premiums, improve the quality of care received by the previously uninsured, increase the health and longevity of the populous, and even increase economic productivity.

The Physiological Effects of Hirano Bodies in Neuronal Cells Expressing Mutated Tau

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Neurofibrillary tangles (NFTs) are one of the hallmarks of the pathology of Alzheimer's disease (AD). NFTs form when tau hyperphosphorylates, misfolds and then aggregates into paired helical filaments (PHFs). While the mechanism of toxicity due to PHFs in

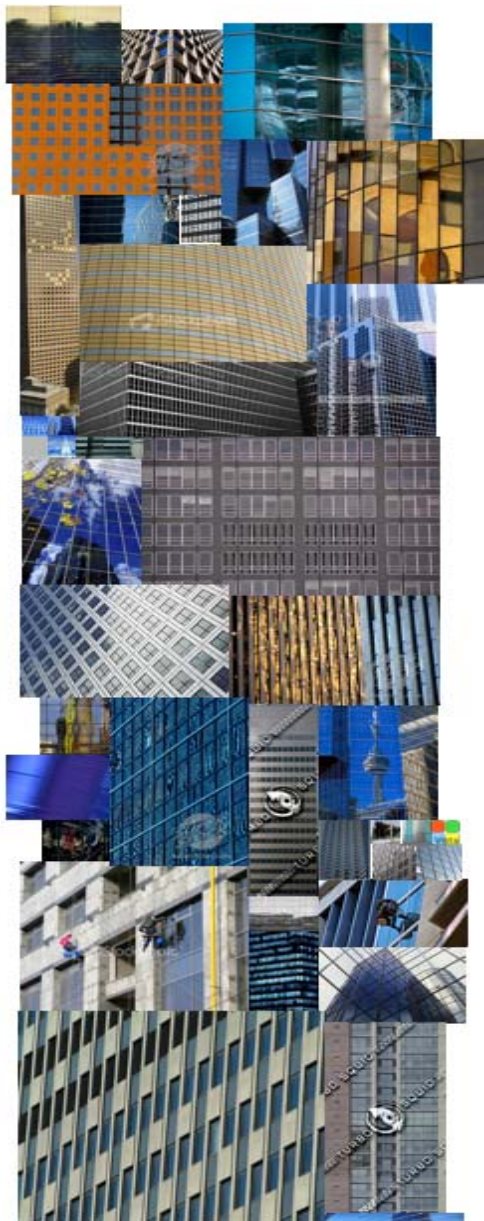
brain is not understood, it is clear that PHFs contribute to cell death. Hirano bodies are paracrystalline, actin-rich cellular inclusions that are more abundant in the autopsied brains of patients with neurodegenerative diseases. The physiological role of Hirano bodies in neurodegenerative disease progression is unknown. It was previously demonstrated that tau localizes into Hirano bodies in brains from patients with neurodegenerative disease.¹ Does the tau protein colocalize with Hirano bodies, and if so, which isoform localizes to Hirano bodies in living cells? Do Hirano bodies protect cells from cell death in the presence of mutated tau? These questions were studied by expressing wild type tau as well as tau modified to mimic hyperphosphorylated tau in wild type, stable GFP expressing, as well as stable Hirano body expressing H4 astrogloma cell lines. Both fetal and adult forms of tau, 352 and 441, respectively, were modeled in this experiment. Immunofluorescence microscopy was used to determine localization of different isoforms of tau in cells with and without Hirano bodies. Preliminary results demonstrated a possibility of localization with Hirano bodies. However, more data are necessary for conclusive results.

1 Galloway, P.G., G. Perry, et al. (1987).
“Hirano bodies contain tau protein.” *Brain Research* 403 (2): 337-340.

Borrowed Building/Search Cycle

Ash Sechler

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Borrowed Building combines separate photographs of skyscraper windows shaped like internet bricks; they are built/collaged on top of each other to form a single building. I wanted to literalize the process of taking things out of their separated contexts and combining them to create something new. The original URLs of each image are used, so the building's existence is

tenuous and is dependent on the individual owners of the pictures. In a way, the building doesn't belong to me; it belongs to the collective photographs' owners. But they also relinquish ownership because they cannot control how their images are used. In *Search Cycle* the viewer/user uses words to search for images from the internet that then appear one at a time in rapid succession (24fps). The images loop, and new images are added once they are downloaded. The search results portray our complex relationships between the words we use and the connotations they carry. Stringing these images together presents a holistic interpretation of how we see the world. They come from an abundance of perspectives and literally blend into each other. The speed of playback is such that afterimages of the previous pictures remain when the next images are displayed (this is how film works). Abstract visual elements are animated, and the viewer gets an impression of a combination of the different images. The synthesis of meanings illustrates a deeper, more whole, and subliminal perspective on the imagery of our culture.

Heart Rate Monitoring is Superior to Accelerometry as an Estimator of Human Energy Expenditure During Physical Activity

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To prevent gradual, unhealthy body weight gain, the 2005 US Dietary Guidelines advise people to engage in 60 minutes of moderate- to vigorous-intensity activity on most days of the week. Pedometers are popular but do not measure exercise intensity. The present study evaluated whether accelerometers or heart rate monitors were preferable for evaluating intensity of work against gravity (walking on level ground, down stairs, or up stairs). Data were collected anonymously from 12 male and female students who wore accelerometers and heart rate monitors while walking up or down stairs or on level ground at rates of 2-5 miles per hour, as judged with a Garmin 76 global positioning device. Activity data obtained with accelerometers and heart rate monitors both

correlated highly ($R^2 \sim 0.91-0.97$) with energy expenditure (MET values) during walking at different rates on level ground. However, while the heart rate monitors clearly detected work done walking on the level ground versus walking upstairs ($P < 0.01$), accelerometers failed to distinguish between walking at the same rate on level ground versus going upstairs ($P \sim 0.24$). Pedometers and accelerometers are instruments which measure external activity, whereas heart rate monitors provide an internal measurement. Neither pedometers nor the accelerometers used in this study provide reliable information concerning the intensity of work. I conclude that inexpensive heart rate monitors provided a reliable indication of work intensity and are suitable for providing feedback for subjects who wish to meet the goals for intensity and time of physical activity stated in the US Dietary Guidelines.

Male Song Performance Correlates of Reproductive Success and Morphological Characters in the Dark-Eyed Junco (*Junco hyemalis*)

Jeff Shapiro

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Within given populations of sexually reproducing species, there exists a wide range of phenotypic variation. Male diversity is commonly used by females to judge male quality. In songbirds, one such male phenotypic trait is song and in many species male song performance can be used as a predictor of individual quality and subsequently reproductive success. Male Dark-eyed Juncos (*Junco hyemalis*), a small North American songbird, typically sing a single, repeated, high-pitched trill. Due to motor constraints, a male's trill rate constrains its frequency bandwidth. A "high performance" song is one in which the frequency bandwidth approaches the physiological limit for a given trill rate. Therefore, more vigorous males should sing higher performance songs. This study investigates A) if Junco song performance is correlated to reproductive success and B) if Junco song performance is correlated to other

phenotypic measures of male quality. We recorded the songs of 65 male Juncos, measured various morphological characters, took blood samples, and tracked their nesting success over the course of the 2008 breeding season. Results are not statistically significant, yet trends suggest that higher performance singers are more physically robust males. Surprisingly though, better singers had lower apparent reproductive success than poor-singing competitors. However, vigorous males are known to have higher actual reproductive success due to more extra-pair fertilizations and therefore we expect results of paternity analysis (pending completion) to demonstrate equal or higher reproductive success for high-performance singers. This result would demonstrate female preference for higher quality song despite poorer parental abilities of those males.

Gender and Developmental Differences in Young Children's Autonomy

Miriam Skiles and Lindsay Jarvis

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Autonomy is characterized by the need to act independently and demonstrate self-governing behavior. Because American culture values independence, parents encourage autonomy and independent exploration in children. Autonomy emerges in toddlerhood around age 2, when children begin to display personal initiative, persistence, and self-regulation. Parents provide greater autonomy support to young children as they mature. Gender differences are likely in children due to differential parental socialization that promotes their sons' autonomy more than their daughters'. This study is aimed to understand gender differences and developmental changes in children's expression of autonomy. Using data from a larger longitudinal research, 20 girls and 20 boys were videotaped during snack time (5-20 minutes) with their mothers at age 2½ and again at age 4. Snack time is a relaxed everyday activity during which the mother and the child are at their maximum comfort level. This would allow an accurate sampling of mother-child interactions.

Both behavioral and verbal measures are used to index autonomy, including: (1) behavioral autonomy: the time the child spends away from the mother to explore the environment, (2) verbal independence: child speech emphasizes the self as unique and autonomous, such as describing internal and/or separate experiences, and (3) verbal assertion: child verbal or nonverbal response to the mother reflecting personal initiative and/or persistence. It is predicted that both genders would show an increase in autonomy from age 2½ to 4. Additionally, boys would demonstrate more autonomous behavior. Findings of this study can benefit parents and educators to promote positive development.

The Chariot Above the Heavens and the Ladder Upon the Earth: An Exploration of Love in the Writings of Plato

Michael Slade

Dr. Frank Harrison, Department of Philosophy, University of Georgia

In the popular imagination, Plato's Socrates is famous for his self-deprecation. Within the Platonic corpus, Socrates claims expertise in only one area: the art of Eros (generally translated as "love"). Despite its anomalous status, Eros is discussed explicitly only twice, in *Phaedrus* and *The Symposium*. The focus of my presentation is the analysis and (hopefully) resolution of the surprisingly different ideologies presented in these two dialogues. Scholars have tended to ignore Plato's internal inconsistency on the topic of Eros, either privileging one dialogue over the other or employing fuzzy generalities to establish their "unity." The disparity is, however, very real. Though both stories end with the apprehension of the Beautiful, the gap between the rational erotic process of *The Symposium* and the "divine madness" of *Phaedrus* is, at best, jarring. Since the Beautiful is closely tied to a host of other key Platonic concepts, including the Good, understanding the ascension to it is hardly trivial. Indeed, exploring the conflict between these visions is to ask the very fundamental question "How does Plato view love, philosophy, and the pinnacle of human

existence?" This paper will begin to answer this question by examining the contrasting descriptions (presented through myth and argument) of Eros offered in *Phaedrus* and *The Symposium* and unpacking the philosophical methodology (and, therefore, guide for human conduct) each recommends. The product of this analysis will then be brought into the larger context of Plato's other writings in hope of offering a characterization of his overarching vision and clarifying the role of key concepts in his thought.

Using fMRI and Neuropsychological Tests to Index Brain Function Following a History of Multiple Concussions

Devin Smith – CURO Scholar

Dr. L. Stephen Miller, Department of Psychology, University of Georgia

Concussive injuries occur often in physically trying contact sports such as football and rugby. These injuries can impair neural activity which in turn negatively effects neurocognitive performance. The purpose of this experiment is to use functional MRI (fMRI) to define and track temporal changes in brain function associated with concussive injuries; assess the positive relationship between fMRI defined brain function and neurocognitive performance using traditional neuropsychological tests; and investigate the relationship between fMRI defined brain function and symptom permanence in athletes with a history of multiple concussions. Based on previous research and the extant literature it is expected that athletes with a history of multiple concussive injuries will show specific patterns of fMRI BOLD response that differentiate them from matched controls. It is also expected that participants with a history of multiple concussions will perform significantly worse on the neuropsychological tasks than matched controls. However, the results indicate no such findings; in fact, there were no significant differences between the experimental group and their control counterparts on the neuropsychological testing, fMRI defined brain activation, response time or accuracy on the fMRI tasks. These results could point to greater neuroplasticity amongst young athletes than was

previously thought. It is possible that the tasks used didn't accurately measure traits that are changed after concussive injuries, or the sample size may not be large enough to show statistically significant differences in behavioral or fMRI data. Finally, it is possible that having two to three concussions is below the threshold at which one can expect to see permanent changes.

Senescence and the Y Chromosome

Maren Smith

Dr. Kelly Dyer, Department of Genetics,
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Recent research has shown that the Y chromosome has the ability to alter expression of autosomal and X-linked genes (Rice 2001, Lemos et al 2008). Many of the genes influenced by the Y chromosome are known to be involved in pathways that play a role in aging, suggesting a role for the Y chromosome in the aging process. Our research goal is to investigate whether Y chromosome variation causes significant variation in aging. We will create 20 isogenic lines of *Drosophila melanogaster* flies. The lines will be identical for autosomes, X chromosomes, mitochondrial DNA, and cytoplasm. We will use 10 Y chromosomes from an African *D. melanogaster* population and 10 from a North American population. Organisms from these lines will be tested both for longevity and stress resistance to measure effect of the Y chromosome on aging. We will also present data on the level of genetic differentiation between Africa and North American Y chromosomes. The level of genetic differentiation will be used to measure the significance of variation in longevity and stress resistance. Our hypothesis is that there will be significant variation in longevity, stress resistance, or both between the African Y chromosome flies and the North American Y chromosome flies.

The Dehumanization of War and the Female Condition

Sarah Smith

Dr. Hyangsoon Yi, Department of Comparative Literature, University of Georgia

In Korean War literature from the mid-1950s onward, many Korean authors depict the war and the subsequent American occupation as a gendered event. South Korea is typically pictured as a female (often a prostitute for the military) who is invaded, dehumanized and destroyed by the overwhelming masculine force of Western culture. In O Chong-hui's "Chinatown," the author examines the gendered nature of war violence and how it impacts the lives of South Koreans. The ravaged and impoverished city of Inchon in the piece becomes a metaphor for the female body, the actual physical site upon which ideological and cultural warfare is fought. The setting of the war-ravaged port city highlights the female characters' lives and bodies as they are torn apart through childbirth, insanity, sexual violence, and menstruation. O Chong-hui drives the connection between the physical setting of Inchon and the female condition through synesthetic metaphors that immerse the reader in the gritty physicality of the place. The author's heightened awareness of female bodies presents severe consequences—the reduction of women's identities to mere bodies leads to the "bestialization" or dehumanization of the women. O realizes this dehumanization through gruesome animal anecdotes that permeate the story. Ultimately, O makes the connection between the South Korean women's dehumanization through Confucian male supremacy and the devastating dehumanizing effects of war violence on the South Koreans.

Examining the Attitudes of Georgians Toward Universal Health Care and the Consumption Tax

Donald Snyder – CURO Apprentice

Dr. James Bason, Survey Research Center,
University of Georgia

Two of the biggest issues in the nation today are healthcare and tax reform. Roughly 47 million Americans are without health insurance, a significant problem politicians and Americans from both sides of the aisle want to fix. The current tax code now exceeds a stupefying 60,000 pages. Some have argued replacing the complex tax code in place today with a simple

sales tax applied at the register whenever someone purchases a good, known as a consumption tax. I created a series of questions on both of these issues that were included in the fall 2008 semester's Georgia Poll, a statewide public opinion survey, to determine the opinions of Georgians on these issues. The results were thus: (1) the approval on the consumption tax items were significantly higher than the rest of the nation, most likely due to the impact of the FairTax and its proponents; (2) the results on the universal health care items were slightly less favorable than national results, most likely because of the large number of Republicans in Georgia, whose party platform disapproves of the measure; and (3) each item was broken down into demographic groups to analyze the statistical significance of answers across groups like gender, party identification, and income. As a result, it seems more likely that the state of Georgia would replace its income and other taxes with a pure consumption tax, and less likely that it would make any reforms that would put it closer to universal health care.

Exclusive Consumption of Sugars as a Biological Means to Convert Lignocellulosic Hydrolysates Effectively

Neeraj Sriram – CURO Summer Fellow
Dr. Mark Eiteman, Biological & Agricultural Engineering, University of Georgia

Scientists are increasingly shifting their focus from tapping food products to using relatively inexpensive substrates such as lignocellulose (plant biomass) to produce bio-ethanol. During fermentation, a single microorganism, specifically *Escherichia coli* (*E. coli*), generally consumes multiple sugars (glucose, xylose, arabinose, glycerol, etc.) released by hydrolysis from lignocellulosic materials in a sequential manner, drawing out the length of the process in producing ethanol. Lack of a microorganism able to ferment efficiently and simultaneously all sugars has been one of the main factors preventing utilization of lignocelluloses. Recently, a novel approach was proposed for the simultaneous conversion of xylose and glucose sugar mixtures into microbial products such as ethanol (Eiteman et al. *J. Biol. Eng.* 2:3, 2008).

This approach involves using multiple strains of *E. coli*, which are each selective in their consumption of a carbon source; for example, one is unable to consume only glucose and the other is unable to consume only xylose. Frequently, however, other sugars, such as arabinose and glycerol, are also found in lignocellulosic hydrolysates. Here, we report results of batch fermentations using an *E. coli* strain KD777, which has mutations in three genes responsible for glucose uptake (*ptsG manZ glk*), which would presumably prevent the metabolism of this carbohydrate. However, in a mixture of xylose and glucose, this strain will consume the xylose first, but will then slowly degrade the glucose. In a mixture of arabinose and glucose, the two sugars are consumed concurrently. In a mixture of glycerol and glucose, glycerol is exclusively consumed. Recently, we have employed RNA microarray technology to determine which genes are expressed in the presence of glucose and xylose compared to in the absence of glucose in order to determine the mechanism by which the glucose is consumed.

The Development of Directional Understanding in Three- to Five-Year-Old Children

Lenae Stansky – CURO Scholar and Krisztina Varga
Dr. Janet Frick, Department of Psychology, University of Georgia

Endogenous orienting occurs when a meaningful cue, such as an arrow, is used to direct attention toward a peripheral target. Adults and children as young as four years of age respond faster to a target that is cued by a central arrow than to an uncued target. However, the nature of the understanding of the arrow by young children is not well understood. Therefore, the current study explores this issue by setting the perceptual “weight” (which is usually heavier on the side of the arrow head) of the arrow cue against its symbolic meaning (directional indication). In this project, 3- to 5-year-old children were tested using various centrally located arrow cues to test the hypothesis that as development progresses, there is also a progression of understanding of

arrow cues from a perceptual to a symbolic understanding. Children sat in front of a computer monitor and were presented with arrow cues followed by peripheral targets. The time it took them to make an eye movement to the target was measured using frame-by-frame coding. The results showed that 3- to 5-year-olds do not rely entirely on either the perceptual characteristics or on the symbolic nature of an arrow, as no reaction time differences were observed between valid and invalid trials ($p > .05$). Future research is proposed to investigate the understanding that young children have of important directional cues such as arrows.

Using Immunohistochemistry for the Detection of Rabies Antigen in Various Mammalian Species

Lindsay Stein – CURO Scholar
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University of Georgia

Rabies is a fatal zoonotic viral infection of the central nervous system that can affect all mammalian species, including humans. It is transmitted by the bite of a rabid animal and those infected die of acute progressive encephalitis. The virus tends to localize in specific parts of the brain in various species. Diagnosis of rabies can be problematic and current techniques either have operator safety or test sensitivity problems. The development of immunohistochemistry is a promising tool for safe and accurate detection of rabies infection and has advantages for use in developing countries. In a retrospective study, immunohistochemistry (IHC) was applied to 26 archival cases of rabies using a commercial polyclonal antibody. Eight species were studied including horse, cattle, llama, pig, dog, cat, raccoon and skunk and all cases had been previously diagnosed using histopathology and/or fluorescent antibody testing (FAT). The IHC test successfully highlighted the presence of rabies virus antigen in each species and demonstrated characteristic distributional differences throughout the brain. In carnivores, the hippocampus was the preferred site for rabies antigen, and in horses the spinal cord and

medulla oblongata were optimal. For cattle, the preferred site was brainstem followed by cerebellum and for raccoons and skunk, IHC positive staining was widely dispersed. This test should prove useful in enhancing the diagnosis of rabies through informed selection of brain segments for testing. Adoption of IHC for rabies diagnosis in formalin-fixed tissues offers promise for control programs for this serious public health problem.

Power and Influence in Southeast Asia: A Study of the Methods Used by India, China, Japan, and the United States

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CURO Summer Fellow
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States use either hard or soft power to influence events around them. Hard power relies on military and economic incentives and punishments; soft power uses more abstract aspects of economic dependence or moral authority to reach the desired outcome. This study looks at India, China, Japan, and the United States, known as power countries, and their influence on Southeast Asia. In order to measure hard and soft power's effectiveness, the independent variables are bilateral trade and arms percentage. Bilateral trade measures soft power by looking at what percentage of a Southeast Asian country's GDP comes from bilateral trade with a power country. Arms percentage, which measures hard power, is the percentage of the military expenditure that a state spends on bilateral arms transfers. These variables are then compared with bilateral events data and UN disagreement percentage through a statistical analysis program, STATA. The study seeks to find the relative efficacy of both types of power for a given year. The analysis shows that cooperation is positively correlated with arms percentage and negatively correlated with bilateral trade, which implies that hard power is more effective than soft power over time. It also indicates that both independent variables' significance as factors for increased cooperation rise when they are used together. Therefore, soft power is more effective when it is used with

hard power. These results show that soft power, although important, is not a strong factor in influencing other nations, as select items of literature within the field imply. Hard power is still an important factor in affecting other states' decisions.

Neuropeptide Signaling in *Drosophila*: A Cell-Specific Functional Dissection of the Proprotein Processing Protease *amontillado* (*amon*)

Caroline Summers

Dr. Michael Bender, Department of Genetics, University of Georgia

Neuropeptide signals are key regulators of cellular growth, development, and physiology in multicellular organisms. Neuropeptides relay signals to cells by binding to membrane-bound receptors initiating intracellular signal transduction networks. Neuropeptides are initially produced as larger inactive precursor molecules that are activated through proteolytic cleavage by proprotein convertases and by other subsequent modification events within the secretory pathway. The *Drosophila amontillado* (*amon*) gene, which is required for normal growth and development, encodes the homolog of the mammalian proprotein convertase 2 (PC2). By investigating the requirements for *amon* function in specific neuronal cell types, we will investigate whether and how neuropeptide processing contributes to the regulation of development and physiology. This thesis specifically considers *amon* function in corazonin-producing neuronal cells. Corazonin is an insect neuropeptide associated with ecdysis, the process of larval molting, and with the regulation of glucose levels. *Amon* mutants show defects in ecdysis and glucose regulation, suggesting that *amon* may act upstream of corazonin. To determine whether *amon* is required in corazonin-producing cells for normal growth and development, we are asking whether reduction of *amon* expression in these cells results in defects in growth, developmental progression, or glucose homeostasis. If loss of corazonin signaling is responsible for defects in *amon* mutants, we predict that reducing *amon* expression should lead to ecdysis defects or

hypoglycemia. In a complementary approach, we are investigating whether *amon* is sufficient for rescuing normal growth by restoring *amon* to corazonin-producing cells in an otherwise *amon*-deficient animal.

The Neurotrophic Action of Botulinum Neurotoxin

Joshua Sumislawski – CURO Scholar

Dr. Julie Coffield, Department of Physiology & Pharmacology, University of Georgia

Botulinum neurotoxin, the agent that causes the paralytic disease botulism, is the most poisonous substance known. The ability of botulinum neurotoxin serotype A (BoNT/A) to produce flaccid paralysis makes it both of public-health concern as a biological weapon and of medical interest as a versatile therapeutic agent (BOTOX®). Less appreciated is the frequent observation that poisoned nerve endings respond by initiating and extending neurites. This phenomenon, termed sprouting, has now been proposed as an indication that the binding of BoNT/A to the neuronal membrane activates intracellular signals that are independent of its already well-characterized paralytic action. Supporting this novel idea, recent studies have demonstrated that the ability of the toxin to induce sprouting is concentration-dependent and counteracted by receptor antagonists. This study addressed the hypothesis that BoNT/A promotes neurite outgrowth through a signaling pathway that depends on the second messenger cyclic adenosine monophosphate (cAMP). To test this hypothesis, primary cultures of motor neurons from embryonic mice were exposed to BoNT/A with and without several inhibitors of cAMP-dependent pathways. In the presence of the inhibitors, the ability of the toxin to induce sprouting was eliminated. These results suggest that BoNT/A promotes neurite outgrowth of embryonic motor neurons via cAMP-dependent intracellular signaling. Additional studies are necessary to further our understanding of the neurotrophic action of this potent toxin.

Isolation and Identification of Novel Acidobacteria and Verrucomicrobia from Forest Soil

Shruti Suresh

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About 5 % of all the prokaryotic cells on Earth are in the soil. These are comprised largely of diverse soil bacteria which play vital roles in the biogeochemical cycles that drive terrestrial ecosystems. However, the metabolic capabilities and ecological functions of many groups of soil bacteria remain unknown due to the lack of cultivation methods to obtain representatives for scientific investigation. The purpose of this study was to isolate and identify novel soil bacteria using new cultivation strategies.

Specifically, bacteria belonging to the phyla Acidobacteria and Verrucomicrobia were cultivated after extended incubation in soil chambers. Different microbial media were supplemented with soil extract and inoculated in triplicate with soil suspensions. The plates were incubated for 10 weeks; DNA was extracted and further checked for target organisms by PCR amplification of the 16S rRNA gene with phylum specific primers. Individual colonies from replicate plates were transferred to a 96 well block on the same medium. Following growth, these cultures were screened again by the same PCR method. Positive cultures were further purified by subculturing and identified by sequencing of the 16S rRNA genes. Further investigation of these bacteria will help identify their physiological and biotechnological capabilities. These bacteria are predicted to hold great potential in the field of agriculture.

How Parental Gender Beliefs Affect Children's Preference for Gender Stereotyped Toys in Low-Income Families

Leigh Tankersley, Robert J Gentry, and Heather E. Howell

Dr. Tsu-Ming Chiang, Department of Psychology, Georgia College & State University

Parents foster gender socialization by selecting toys, books, and clothes for their children from an early age. Children use these stereotyped

gender cues, directed by parents, to guide their understanding of immediate contexts and behaviors. This study examined the influence parental gender attitudes had on the development of children's preference for gender-specific toys from low-income families. Seventy-two children (mean, 41.64 months, 44 boys) were recruited during the last two years from Headstart programs. Parents completed a survey, consisting of parental observations, gender beliefs, and practices regarding purchasing items for their children. Children's toy preference were assessed at school through interviews, toy selection from a given box, and free play with gender-related toys. The toy selection was videotaped and analyzed. The preliminary results showed strong evidence in children's gender stereotyped toy preference. One-way ANOVA revealed significant gender differences in reported favorite toys ($F(1, 17) = 6.766, p = .019$) and toys selection from the box ($F(1, 23) = 29.631, p = .000$). The top two toys selected by girls were *Polly* (27.5%) and a *Doll* (17.7%), while boys favored *Trucks* (43.5%) and *Fire Fighter* (22.6%). Parents reported purchasing *truck* ($F(1, 32) = 9.318, p = .005$) for boys and *Barbie* ($F(1, 32) = 219.49, p = .000$) for girls. Therefore, parental attitude may directly influence children's preference for gender stereotyped toys. Further implications from parental gender socialization will be discussed at the conference.

The Evolution of a Scientific Community Through Social Network Analysis: The Case of Autism

Christine Tarleton – CURO Scholar

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Studies of the social network structures of scientific collaborations can highlight apparent temporal differences within a developing research field. This project will provide a historical analysis for how the autism community has continually evolved as a multi-disciplinary field from 1970 to 2006. Social network visualizations of the autism research community were created using UCINET software, and co-citation analysis provided the

method of linkage. This disciplinary social mapping of autism research during this period indicates that the field has changed dramatically from a weak network with a primarily psychological base in the 1970s to a very robust, interdisciplinary scientific community with a solid genetics core by the late 1990s. A year-by-year analysis of the networks appears to correlate to specific historical events; for example, an increased interest of advocacy groups in autism research post-1996 occurs simultaneously with a more rapid expansion and increased interconnectivity of the autism community. Additionally, the rise and better availability of genetic technology as well as the discovery of a link between Fragile X syndrome and autism occur within a reasonable time frame to suggest that key scientific discoveries affect the makeup and evolution of a scientific community. By thoroughly investigating the history of the autism field and comparing it to a year-by-year analysis of the composition of its scientific community using data previously generated through social network analysis (SNA), this project aims to provide new insight into the historical causes of research field expansion and to determine what types of internal and external causes might shift the disciplinary focus and makeup of a newly emerging research community.

Genetic Duplication and Amplification in the *Acinetobacter baylyi* ADP1 Genome

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University of Georgia

Gene amplification is a common process with medical and evolutionary significance. Here, a system for studying gene amplification in the soil bacterium *Acinetobacter baylyi* ADP1 was expanded. Parent strains lacking two transcriptional activators do not grow on benzoate (Ben⁻). From these strains, spontaneous Ben⁺ mutants arise with multiple copies of a chromosomal region (amplicon) that includes key catabolic genes, thereby increasing gene expression and allowing growth on benzoate. Initially, gene duplication results from recombination between DNA on either side of

the amplicon. Homologous recombination then generates additional gene copies that are retained under selection. The characteristic feature of amplification is a junction that identifies the precise position of the initial recombination event. A promoter mutation in the parent strain may have artificially restricted the pool of viable amplification mutants. To remove this bias, we modified protocols by selecting for growth of the original parent strain on an alternative carbon source, anthranilate. In a second approach, a similar parent strain was used that lacked the promoter mutation but retained all other defining characteristics of the original parent strain; mutants were selected for growth on benzoate or anthranilate. Our results indicate that illegitimate recombination was the major type of duplication event underlying amplification. Also, an unusual type of position-specific illegitimate recombination occurred at precise DNA sites in multiple independently-isolated mutants. These conclusions were independent of the presence of the promoter mutation. Overall, the ADP1 system has proven to be viable for efficiently studying gene duplication and may prove useful for elucidating mechanisms.

Human Random Capacities Through Repeated Numeric Sampling

Aileen Thomas – CURO Scholar, CURO
Summer Fellow

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Randomness in the macroworld of human actions would contradict the theory of causal determinism, that all events occur as a direct result from antecedent factors, and be a pivotal contribution to philosophical debates on free will. The aim of this research is to understand human capacities and motivations of randomness. Can human beings act truly randomly or are their actions predetermined? Participants completed a short survey and entered 100 “random” digits into a grid. The numeric sequences generated were statistically analyzed through tests described by Donald Knuth in *The Art of Computer Programming, Vol. 2* (1981) to determine their degree of

randomness. These sequences were compared against sequences generated from different methods of randomization consisting of dice rolls, decimal digits of pi, and deterministic formulas used by Texas Instruments programmable calculators and Java, which underwent similar analysis. Hypotheses of uniformity were tested using Chi-Squared analysis in frequency and serial tests. Sequences generated from dice did not adequately pass frequency tests using alpha level 0.05.

Alternatively, the `nextInt()` and `nextInt(long n)` methods of class `Random` in Java, `randInt(x,y)` from Texas Instruments, the decimal digits of pi, and human participants produced sequences that did adequately pass the frequency test. Of these, only human participants failed to pass the more rigorous serial test. Due to the theoretical foundation of the research question, it is impossible to produce concrete conclusions. However, the sequences produced by human participants most closely resembled those produced from deterministic formulas.

Effects of Vertebral Fusion on Lateral Bending Spinal Motion of Women with Adolescent Idiopathic Scoliosis (AIS)

Jennifer Tooher and Jaharris Collier – CURO Apprentice

Dr. Kathy Simpson, Department of Kinesiology, University of Georgia

Spinal fusion is the most accepted procedure currently performed on adolescent idiopathic scoliosis (AIS) patients with scoliotic curvature greater than 40°. The purpose of the overall study is to determine the effects of spinal fusion on range of motion (ROM) during lateral bending tasks. We expect limitations in ROM of lateral bending due to fusion, but there is little understanding of the effects of fusion on vertebral motions or ROM. The pilot test compared the motions of two women with lumbar scoliosis: one with fusion (FUSED) and a control without fusion (NFUSED). VICON® motion-measurement system captured spatial locations of 46 reflective markers on the spine and body during three trials of maximum trunk lateral bending. As hypothesized, FUSED experienced nearly twice the loss of lumbar

motion than NFUSED in the lumbar-sacral segments. Both women displayed greater lateral motion of the thoracic compared to the lumbar spine. However, FUSED did not display greater thoracic motion than NFUSED, thereby tentatively disproving that the nonfused spine of AIS individuals will display greater ROM to compensate for the fused section. Future research will potentially confirm these findings and determine spinal ROM and spinal mechanics that AIS individuals use to accomplish functional tasks.

Inhibition of LPA Signaling Pathways by RGS Protein Overexpression in Ovarian Cancer Cells

Kathryn Turner – CURO Scholar, CURO Summer Fellow

Dr. Shelley Hooks, Department of Pharmaceutical & Biomedical Sciences, University of Georgia

Lysophosphatidic acid (LPA) is a signaling molecule that induces survival, metastasis, migration, and growth in ovarian cancer cells by binding to G-protein coupled receptors (GPCRs), which in turn activate G-proteins. Regulator of G-Protein Signaling (RGS) proteins deactivate these G-proteins, and therefore stop the LPA signal. RGS proteins are a likely therapeutic target for the cancer causing activities of LPA because there are multiple forms that bind specifically to different G-proteins, therefore potentially regulating specific signals and outcomes. Previous data suggest that RGS proteins play a role in regulating the LPA signal in ovarian cancer cells. By comparing the effects of LPA in RGS sensitive and insensitive cells, we observed differences in cell growth, cell migration, and the production of the second messengers cyclic adenosine monophosphate (cAMP) and inositol phosphate (IP). My current project focuses on overexpressing specific RGS proteins and determining their effects on LPA stimulated outcomes in SKOV-3 ovarian cancer cells. LPA causes a decrease in the second messenger cAMP, and we have found that overexpression of RGS2 and RGS19 blocks this inhibition, as shown through a cAMP assay. Additionally, LPA causes an increase in cellular

migration, which is also inhibited by RGS2 and RGS19, as shown in a wound induced migration assay. Furthermore, RGS 3 overexpression seems to have no effect on cAMP levels or migration. Future studies include overexpression of other RGS proteins in order to determine their roles, and lowering levels of RGS proteins in ovarian cancer using siRNA.

Antisaccade Performance and Deficit Characteristics in a Normal Population

Manouela Valtcheva – CURO Summer Fellow
Dr. Jennifer McDowell, Department of Psychology, University of Georgia

Patients with the deficit syndrome of schizophrenia suffer from more debilitating and persistent symptoms than nondeficit patients, including severe anhedonia (inability to experience pleasure) in the absence of depression. Previous research suggests a higher degree of cognitive disruption within deficit patients as indicated by poor performance on eye movement paradigms. The antisaccade task requires inhibition of a reflexive glance towards a peripheral stimulus and generation of a glance to an equidistant location in the opposite direction. Normal subjects who score high on clinical scales are often used as a proxy for people at risk for specific mental illnesses. Finding an analog of deficit schizophrenia within a normal participant sample could help in future risk-studies. It was hypothesized that participants displaying a higher number of deficit-like symptoms (high schizotypy (subclinical schizophrenia-like symptoms), high anhedonia, low depression) would have worse antisaccade performance. Normal undergraduates (N=350) completed self-report questionnaires measuring schizotypy, anhedonia, and depression and performed the antisaccade task. Although there were no overall relationships between deficit characteristics and antisaccade performance in the total sample, in the top 25% of the antisaccade distribution, higher schizotypy was associated with worse antisaccade performance. Higher schizotypy ratings were associated with longer antisaccade latencies. Overall, the findings suggest that a group of normal undergraduates, scoring high on

self-report clinical scales, have mild disruptions in cognition but are not a good proxy group for the deficit syndrome. Because this may be due to restrictive demographic effects, additional studies with larger, more variable samples would be informative.

Analyzing the Gender Gap in Educational Achievement in Children Ages 5-12

Jessica Van Parys

Dr. David Mustard, Department of Economics, University of Georgia

Several studies investigate differences in early childhood educational achievement by race and ethnicity. Few researchers, however, evaluate the performance gap by gender. This is the first study to use the National Center for Education Statistics (NCES) Early Childhood Longitudinal Study – Kindergarten Cohort 1998-99 (ECLS-K) to analyze the variance in educational achievement by gender in children ages 5-12. The data begin with 12,000 students in kindergarten and provide information on each child's home and school environments at each stage of the evaluation in the kindergarten, first, third, and 5th grades. Using cross-section regression analysis and controlling for socioeconomic status and school characteristics, we find that females score 1/7 of a standard deviation higher than males in standardized reading scores, while males score 1/22-5/22 of a standard deviation higher in standardized math scores. These differences appear in early kindergarten, persist through the 5th grade, and reflect different gaps than classroom grades. Females earn 1/4 of a standard deviation higher reading grades, and there is no statistically significant difference in math grades. The variance in grades does not match the variation in test scores, and indeed, places females ahead of males in this measure of academic achievement. Using a behavioral rating scale as the dependent variable, we find that teachers rate females as more likely to pursue learning activities and display strong interpersonal skills, while males are more likely to externalize problems and exhibit impulsive behavior. These results suggest that more non-cognitive skills at early ages for females may help to explain the

gender gaps in measured educational performance.

Measuring the Orderliness of Thought

Hemali Vin

Dr. Michael Covington, Institute for Artificial Intelligence, University of Georgia

Schizophrenia is a severe brain disorder characterized by disorganized thinking that can significantly interfere with the ability to function normally. Proper treatment is contingent on early detection. The Salient Items Test is a method devised by Dr. Michael Covington to detect each type of disorganized thinking that occurs in schizophrenia. Research shows that when asked to describe a picture, a patient with schizophrenia will often fail to mention all of the prominent objects (salient items) in it, whereas a healthy person will almost always produce a complete list. Dr. Covington is now investigating whether patients with schizophrenia, even when they name all the items, do so in a less orderly fashion than healthy people. My task involves development of a program in the C# programming language to implement a mathematical method for scoring the orderliness of picture descriptions. This program analyzes files of Comma Separated Values (CSV) to create distance matrices of the values. Distance matrices are used to reflect the order of the items in relation to each other. The distance matrices will be compared to a “normal matrix” to determine if there is a difference in scores of the Salient Items Test between healthy controls and of schizophrenia patients. The program is now being tested to assess its usefulness and accuracy. To test the program, artificial data of orderly and disorderly picture descriptions will be constructed and scored. Once perfected, this program could allow for faster and more accurate identification of schizophrenia patients.

Differential Regulation of Oxidative and Thermal Stress Tolerance upon Changes in Levels of O-GlcNAc Modified Proteins *in vivo*

Wei Wang – CURO Scholar

Dr. Lance Wells, Department of Biochemistry & Molecular Biology, University of Georgia

From *C. elegans* to mice, reduced signaling through the insulin-like pathway extends lifespan. However, reduced signaling, defined as insulin resistance, also precedes and is the hallmark of type II diabetes. Our laboratory has demonstrated previously that elevation in intracellular glycosylation of nuclear and cytosolic proteins via the carbohydrate post-translational modification O-linked beta-N-acetylglucosamine (O-GlcNAc) induces insulin resistance. More recently, the laboratory has demonstrated that the O-GlcNAc cycling enzymes (OGT that adds and OGA that removes the modification) modulate median lifespan in *C. elegans*. Our observations also suggest that O-GlcNAc modification of proteins affects oxidative stress tolerance but not thermal tolerance. We have generated transgenic animals to study how the two processes, oxidative and thermal stress tolerance governed by insulin-like signaling, can be differentially regulated upon changes in the levels of O-GlcNAc modified proteins. Double mutants of *oga-1* and *ogt-1* with GFP-tagged superoxide dismutase-3 (*sod-3*) or heat shock proteins (*hsp-16*) were separately generated and analyzed for differences in activation based on O-GlcNAc modification using the imaging of green fluorescence protein *in vivo*. Since these two stress response genes are regulated via DAF-16 following its nuclear localization in response to insulin-like signaling, double mutants of *daf-16::GFP* with *oga-1* and *ogt-1* were also generated and analyzed for DAF-16 localization and expression. Preliminary data suggest that HSP-16 expression is not affected while SOD-3 is by altering O-GlcNAc levels. Our results suggest that O-GlcNAc is impacting oxidative stress responses in addition to median lifespan in *C. elegans*.

Thermal Adaptation of Soil Microbial Respiration in Laboratory Microcosms

Brian Watts – CURO Apprentice

Dr. Mark Bradford, Odum School of Ecology,
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Respiration of heterotrophic microorganisms decomposing soil organic carbon releases carbon dioxide from soils to the atmosphere. In the short-term, soil microbial respiration is strongly dependent on temperature. In the long-term, the response of heterotrophic soil respiration to temperature is uncertain. However, following well-established evolutionary trade-offs that occur during adaptation of respiratory metabolism to the ambient thermal regime, mass specific respiration (R_{mass}) rates of heterotrophic soil microbes should decrease in response to sustained increases in temperature. The principle of evolutionary trade-offs indicates that enzymes kept at a relatively high temperature for a sustained period of time will have lower catalytic rates compared to enzymes kept at relatively low temperatures for a sustained period of time. Using a laboratory microcosm approach, we tested the potential for the R_{mass} of the microbial biomass in six different soils to adapt to three, experimentally-imposed, thermal regimes (constant 10, 20 or 30°C). To determine R_{mass} rates of the heterotrophic soil microbial biomass across the temperature range of the imposed thermal regimes, we assayed soil sub-samples, employing similar approaches to those used in plant, animal, and microbial thermal adaptation studies at days 1, 7, 21, 50, and 77. As would be expected given trade-offs between maximum catalytic rates and the stability of the binding structure of enzymes, significant effects were observed after 77 days of incubation. R_{mass} rates across the range of assay temperatures were greatest for the 10°C experimentally incubated soils and lowest for the 30°C soils, with the 20°C incubated soils intermediate. The time taken for thermal adaptation to manifest (77 days) suggests that it likely resulted from population or species shifts during the experimental incubation. The relative magnitude of the difference in R_{mass} rates between the different incubation temperature treatments was unaffected by assay temperature, suggesting that

maximum catalytic rate was the enzyme characteristic involved in thermal adaptation.

Weaving the Fog

Daisy Whelan

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Can one determine their own physical position on a day when navigating the clouds becomes the first visual priority? The clouds, manifested as deep fog, provide a blanket of disillusion when positioned so close to the ground. However, the visual distortion that one experiences on a foggy day is based on a structure of perfectly clear water particles. I have interpreted this subject matter through weaving, using some traditional yarns and many alternative materials. Such materials include vinyl-coated yarn, nylon and monofilament mixed with more traditional bamboo, knitted, and cashmere yarns. Weaving lends itself perfectly to interpreting clarity, for the process is a system of design that relies on structure as its livelihood. I have manipulated material and order of pattern, so that my weavings interpret light and movement. Some weavings rely on the density of material to provide disillusion, while others rely on the near invisible nature of the material. Perfect structures form when I allow the setup of the loom to project a perfect pattern. My research tests the viewer's eye. Sometimes lost in the order, the viewer is at other times faced with a complete framework and clarity of order. Positioning is crucial; the weaving will

appear differently depending on the where the viewer stands, just like every position in the fog will take on a different illusion.

Bolivian Wrestlers in Skirts

Abigail Wilson

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Dress serves as a symbolic metaphor of the relationship of the individual to the cultural system and thus is an important means of constructing and articulating gender norms. The analysis of the sartorial practices of indigenous female wrestlers, known as cholitas luchadoras, provides insight into the social/political tension that exists in the contemporary Bolivian society, where domestic and political hostility is rampant. What differentiates the cholitas from (fe)male wrestlers in the Western world is their distinctively feminine and historically grounded dress style. The cholitas consciously choose to wrestle in a lace petticoat, a Spanish-style skirt (also known as a “pollera”) and a colorful, fringed shawl because they embrace and choose to highlight their femininity in such a traditionally masculine and often brutal activity. The pollera is the typical dress of native women in Bolivia, thus the cholitas’ decision to wear the garment underscores the strength and perseverance of these women in the face of all forms of violence in their lives. Through their impractical use of traditional female dress, they not only contest the misogynist treatment of women but the political and economic disenfranchisement of indigenous people as well. Through their acrobatic acts of wrestling these female wrestlers prove that they can fight without sacrificing their femininity or compromising their ethnic identity. In the process, they are actively reshaping and redefining contemporary gender and political roles in Bolivia. The analysis of the cholitas’ practices is informed by Judith Butler’s work on the performativity of gender.

Defining and Regaining the Human Identity: Queries of Existence in Frederick Douglass’s Narrative

Anna Wilson

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This paper explores the process of dehumanization imposed upon African American slaves within the system of American chattel slavery as it is depicted in *The Narrative of the Life of Frederick Douglass: An American Slave*. What does it mean to be human and, conversely, what does it mean *not* to be human? My research has revealed that Douglass’s portrayal is distinguished by animal-related metaphors that the author utilizes to identify the qualities crucial to human identity and thereby the features that are most devastated by the slavery system. This paper also examines Douglass’s rebirth into humanity and endeavors to recognize and elucidate the processes by which these vital human traits are re-implemented into the author’s life. My paper asserts that this journey can be clearly separated into two major stages: the reacquisition of a personal identity and the acceptance of the right to toil for upward social mobility. Both phases are initiated, fueled, and shaped heavily by Douglass’s personal literacy. By clearly differentiating between brute, man, and, perhaps most importantly, the process of transformation from one to the other, Douglass’s *Narrative* creates a standard scale that can be utilized to evaluate the process of human progress. My paper reapplies these historically transcending findings in order to examine several notable individuals and events that have taken part and place within the most recent years of the African American timeline.

8-Chloro-7-hydroxyquinoline and Xanthone Acetic Acid Derivatives as Photoremovable-Protecting Groups with Susceptibility to Two-Photon Excitation

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Photochemistry offers scientists a powerful method of exploring biological processes. Photoremovable protecting groups (PPGs) can quickly release bioactive molecules with a flash of light, activating them and enabling researchers to explore how the timing and location of events triggered by these molecules impact cellular function. In particular, PPGs with sensitivity to a process called two-photon excitation (2PE) enable precise control of the location and timing of release events and often utilize light that is not harmful to biological systems. A firm understanding of how PPG structure impacts 2PE susceptibility is necessary to exploit these powerful compounds to study physiology. The PPG 8-bromo-7-hydroxyquinoline (BHQ) has sensitivity to 2PE sufficient for biological use. The structure of BHQ is based on the compound quinoline. To enhance knowledge of quinoline photochemistry, a similar compound called 8-chloro-7-hydroxyquinoline (CHQ) was synthesized, and its photochemistry studied. The CHQ 2PE cross-section (δ_u), a measure of sensitivity to 2PE, was 0.12 GM at a wavelength of 740 nm. Compared to BHQ, CHQ is less sensitive to 2PE. Two other promising PPGs called 2- and 4-xanthone acetic acid (2-XAA and 4-XAA, respectively) are based on the compound xanthone. The values of δ_u for 2-XAA and 4-XAA were both found to be 2.1 GM at 700 nm. These experiments have established that 2- and 4-XAA have excellent sensitivity to 2PE and might be used to mediate the release of bioactive molecules in biological systems. Our studies are delineating the structural requirements for PPGs to have sensitivity to 2PE.

Preventative Medicine in Water Supplies: A Remodeling of Disaster Relief

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In 2008, the United States Agency for International Development (USAID), a United States federal government organization responsible for non-military foreign aid, responded to over 80 disasters in 63 countries, spending in one fiscal year over \$500 million dollars in disaster response. One of the most destructive effects of natural disasters, especially floods and droughts, is the contamination of drinking-water supplies. Communicable diseases such as Typhoid, Cholera, Hepatitis A, and Leptospirosis, as well as intestinal parasites, are easily transmitted through contaminated water, making the accessibility and quality of public water supplies an immediate priority in the aftermath of a disaster. Poor countries bear a disproportionate amount of health risks and lack the necessary economic resources to minimize the impact. Through a systematic review of the current literature, focusing on relevant case studies, interventions, and survey research, this paper provides a comprehensive synthesis of the current research on the humanitarian, political, and economic benefits of effective mitigation action. The findings show that preparatory measures taken by governmental and nongovernmental aid agencies such as USAID would help mitigate outbreaks of water-borne diseases in the aftermath of a natural disaster, when populations are most vulnerable. This research also provides a review of the biological ramifications that water-borne disease outbreaks in developing countries can have on industrialized western societies, like the United States.

A Sense of Self: Questions of Identity in Contemporary Novels by Second-Generation Turkish-German Women Writers

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As the largest minority, the Turkish-German population plays an important role in contemporary Germany. Turkish citizens first came to Germany in the wake of a guest worker agreement forged in 1961, which allowed Turkish workers to assist in the rebuilding of Germany during the post-war economic boom. Many guest workers chose to remain in Germany and, over time, the group grew into the largest minority living in the country today. The integration of Turkish guest workers into German society has been difficult and caused much political controversy. Questions about what rights should be afforded these "Fremde," or foreigners and their role in German society as a whole prompted many Turkish-Germans to begin putting their ideas to paper. During the 1970s, literature by Turkish-German authors began to emerge and attract attention and recognition when Emine Sevgi Özdamar won the Ingeborg Bachmann prize in 1991. Since the reunification of Germany in 1989, the publication of literature written by Turkish-German authors has increased significantly, especially as the second generation of Turkish-Germans has come of age. Three novels written by female authors of this second generation of Turkish-Germans depict many of the issues the minority as a whole faces. Alev Tekinay's *Nur der Hauch vom Paradies*, Yade Kara's *Selam Berlin*, and Dilek Güngör's *Das Geheimnis meiner türkischen Grossmutter* also cast light on the specific struggles of Turkish-German women of the second generation. The question of self is the most prominent of the thematic elements in the novels, which can be found in feelings and thoughts the characters express about family, gender, and a missing or incomplete sense of belonging in what remains a foreign country. My analysis of the novels against the historical background of both the individual authors and the Turkish-German minority as a whole traces

the conflicts and discusses the answers the authors attempt to provide.

Simplification of Eligibility Requirements for PeachCare for Kids: Increasing Health Insurance Coverage for Georgia's Children

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PeachCare for Kids (PCK), part of the State Children's Health Insurance Program (SCHIP), provides low-cost health coverage for children residing in Georgia. PCK is administered by the Georgia Department of Community Health (DCH). In 2007, the DCH increased documentation requirements regarding proof of income, citizenship, and identity. These measures were not instituted in response to abuses of the program by ineligible individuals according to DCH officials. State and national legislation, academic literature, information from the DCH, and other sources were analyzed to research enrollment patterns of eligible but uninsured children across the U.S. after the implementation of increased documentation requirements to determine SCHIP eligibility. Various nationwide studies have found that increasing required documentation for enrollment in SCHIP has mostly resulted in coverage gaps and denials for eligible children. Analysis of these studies suggests that administrative hurdles regarding eligibility for PCK will result in decreased coverage of eligible children in Georgia, increased administrative costs, and decreased health outcomes for children overall. The reinstatement of simplified verification methods could help maintain and improve child health in Georgia. It is more cost-effective to insure children and provide them with preventive care than to treat later health problems through uncompensated care, especially in light of the recent SCHIP bill signed by President Obama providing potential funding. The basic goal of PCK is to provide health insurance for low-income children in order to improve health outcomes. Increasing enrollment of uninsured children already eligible for PCK will help Georgia reach this goal.

Kennedy, Carter, and Obama: The Role of Faith in Three Democratic Presidential Campaigns

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The constitutional separation of church and state does not preclude the separation of religion and politics; in fact, religion plays a fundamental role in both the Democratic and Republican parties. Popular thought tends to describe the Republican Party as the party of religious voters and religious candidates, but such a description disregards the role and reality of religious faith in the Democratic Party. In this paper, I evaluate public statements from three modern Democratic presidential nominees: John Kennedy, Jimmy Carter, and Barack Obama. There emerge not only faith narratives, discussion of faith's influence on policy, and religious rhetoric, but multiple interpretations of each. I will demonstrate that faith can shape a Democratic campaign in diverse, significant, and unexpected ways.

Expansion and Improvement of the Solar Cooker Project to Reduce Gender Based Violence

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United Nations High Commissioner for Refugees (UNHCR) introduced the Solar Cooker Project, a program where solar cookers are distributed to refugee women for their cooking needs in select African refugee camps in 2005. Deforestation has increased the distance traveled by female refugees to gather firewood for their basic needs, significantly increasing their vulnerability to gender based violence (GBV), including rape, beatings, and murder. The use of solar energy for cooking has dramatically decreased the amount of firewood needed, minimizing the number of trips outside the safety of the refugee camp. This policy paper encourages the expansion of the Solar Cooker Project to other refugee camps with GBV associated with a need for an alternative cooking

energy. The various issues associated with GBV in refugee camps—deforestation, local community tensions over resources, lack of clean water, gender roles, and economic disparity—are explored. Through the analysis of the wide array of factors contributing to GBV rates against female refugees, case studies of the Solar Cooker Project, and interviews with the agencies associated with the creation of the Solar Cooker Project, recommendations are provided to improve upon specific components of the project. New initiatives are also suggested to better financial support, environmental issues, and socioeconomic problems associated with the issue. This research is necessary in order to increase the level of success in helping to eliminate GBV in affected areas and allow for efficient expansion of the project to other UNHCR refugee camps in Africa.

Effect of Microbead Substrates on the Morphology of H945RB.3 Human Neural Progenitor Cells

Angela Zachman

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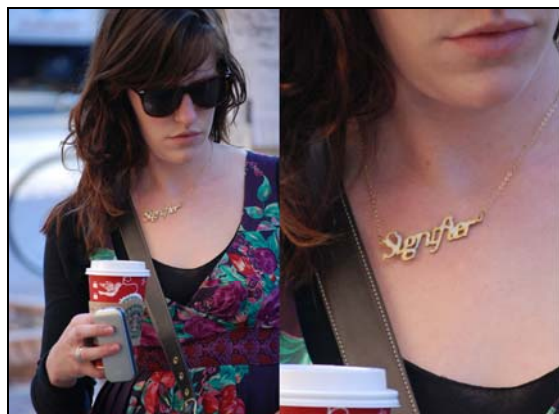
Cells grown *in vitro* are known to have morphological differences from *in vivo* cells, in part due to the flat surface of a petri dish on which they are typically grown. These morphological differences can cause problems in using *in vitro* testing to predict *in vivo* behavior. Growing cells on microbead arrays could allow cultured cells to more closely resemble cells in the body. Previous research has shown that H945RB.3 human neural progenitor cells grown on 2µm diameter bead arrays have a larger area and perimeter than cells grown on a flat surface. In this experiment, we tested the morphological differences of cells grown on smaller 0.5µm diameter beads. Polystyrene beads in solution were spread over a portion of polystyrene coverslips, creating some areas of flat substrates and some areas of microbead substrates. Neural progenitor cells were then cultured on the coverslips and allowed to differentiate for fourteen days. The cells were then fixed on the substrates, dehydrated, and sputter-coated with

gold in preparation for scanning electron microscopy (SEM). Images were taken of cells on both the flat and microbead substrates using SEM, and the area, perimeter, and roundness (defined as $4*\pi*(area)/(perimeter)^2$) of each cell was calculated using computer imaging software. Contrary to our expectations, we found that cells grown on 0.5 μ m bead arrays had a larger area and perimeter than those of cells grown on either a flat surface or 2 μ m bead arrays. This indicated that 0.5 μ m bead arrays are an ideal substrate for cell growth.

Jewelry in the Age of Postmodernism

Marilyn Zapf

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My current work investigates the role of jewelry in society through postmodern methods of critique. I use imitation to point to mass-produced and mass-consumed jewelry, while subtle changes create a distance between the symbol (jewelry) and the signified (status, wealth, and self-image creation). The necklaces reference nameplate necklaces, a trend in the 1980s that re-emerged in 21st century when Sarah Jessica Parker wore one on the HBO series *Sex and the City* and again (in an exaggerated form) in hip hop culture. Additionally, the necklaces are documented in the same context one would expect to find commercial jewelry: paparazzi-like photographs and snapshots found in popular style magazines. However, traditional materials such as gold and silver are not used but mimicked through the use of enamel or a colored glass surface applied to

the base metal copper. In addition, the words spell out the role jewelry plays in society, such as a “signifier” of wealth and a creator of someone’s self-image. My necklaces literalize the function of jewelry in order to simultaneously reveal and subvert the task of ornamentation in popular culture. My work suggests what is really being bought and sold when people buy jewelry through the reference to, but deviation from, popularly recognized materials, forms, and documentation of jewelry.

Genetic Effects of Radiation Exposure on *Rana terrestris* Populations from the Chernobyl Exclusion Zone

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Chernobyl, the largest nuclear disaster in history, resulted in the mass exposure of humans and other species to radiation, which is known from other studies to increase mutation frequencies in DNA. The Chernobyl Exclusion Zone is abundant with amphibians, which are extremely sensitive to contaminants. To determine the effect of radiological exposure on mutation rates, *Rana terrestris* were collected from the Chernobyl Exclusion Zone, as well as nearby non-exposed control sites, and subsequently bred. DNA was extracted from 48 offspring from each of four families (2 contaminated, 2 control). Twelve microsatellite loci (i.e., repetitive regions of DNA that are codominantly inherited) were identified in the *Rana* genome and amplified using Polymerase Chain Reaction (PCR). The PCR products were run on an ABI 3730xl sequencer and analyzed using Genemapper 3.7 software. By comparing the lengths of the microsatellite DNA fragments between parents and offspring, it can be determined if any mutations have occurred. As the average mutation rate for most microsatellites is around $10E^{-3}$ (e.g., one in a thousand), we expect to identify as many as 1-10 baseline mutations within each of the four families. Analysis of Variance (ANOVA) will then be used to compare the number of mutations between control and contaminated sites to determine if radiation from nuclear

fallout has caused an increased mutation rate. The results from this study will help to quantify the impact and genetic risks associated with the Chernobyl disaster, while providing the experimental design to assess potential negative effects from other radiological exposure.

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